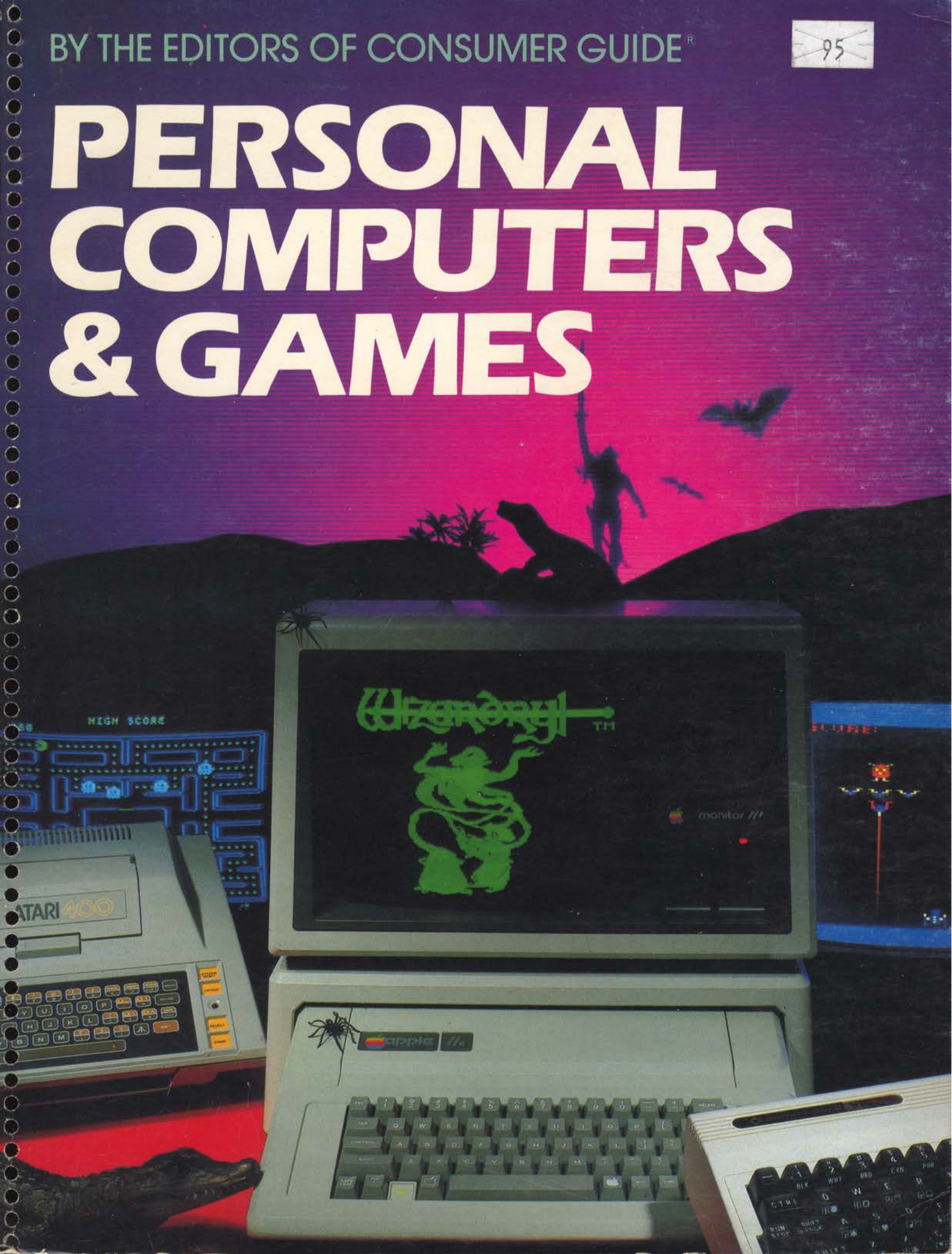
BY THE EDITORS OF CONSUMER GUIDE®

95

PERSONAL COMPUTERS & GAMES



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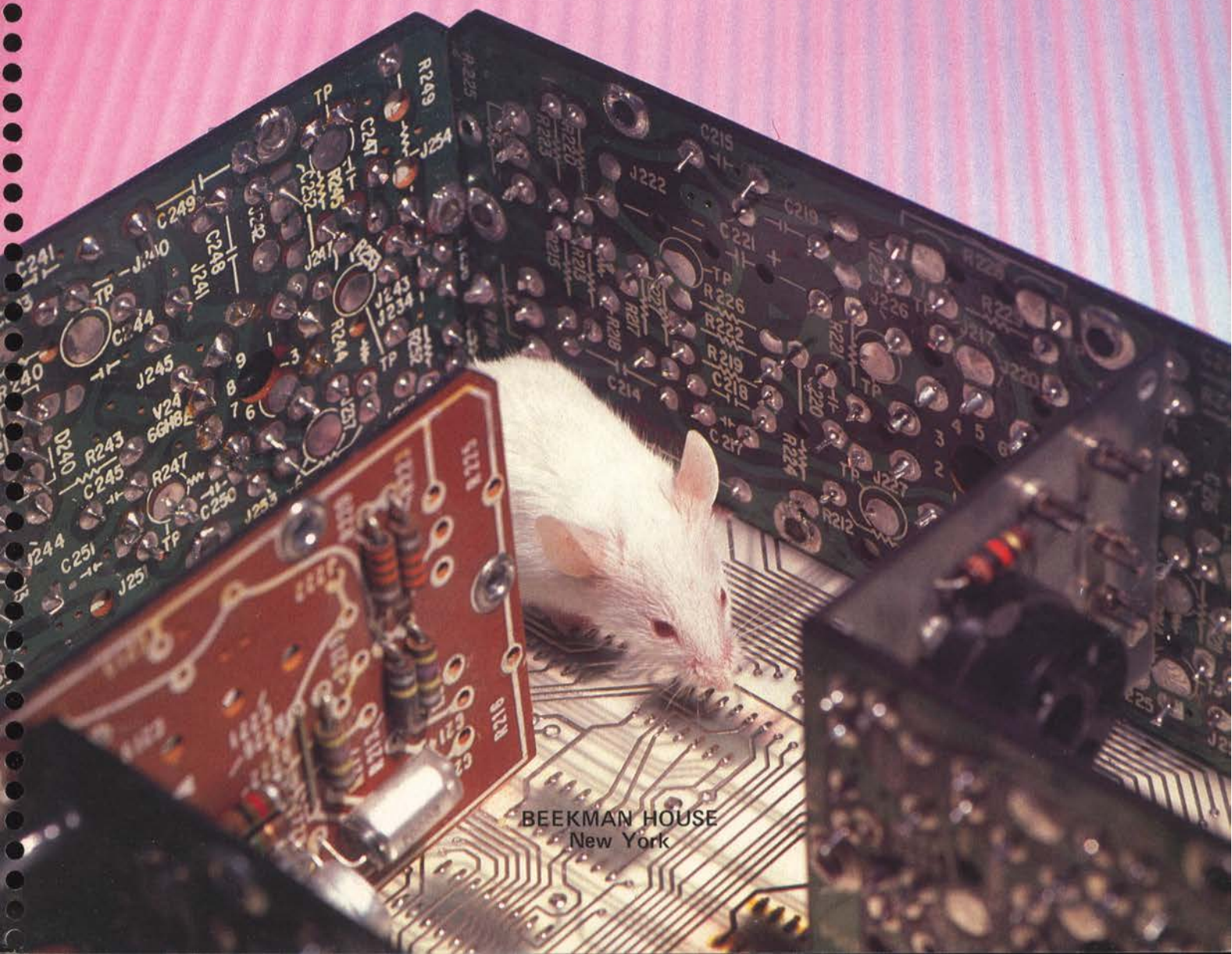

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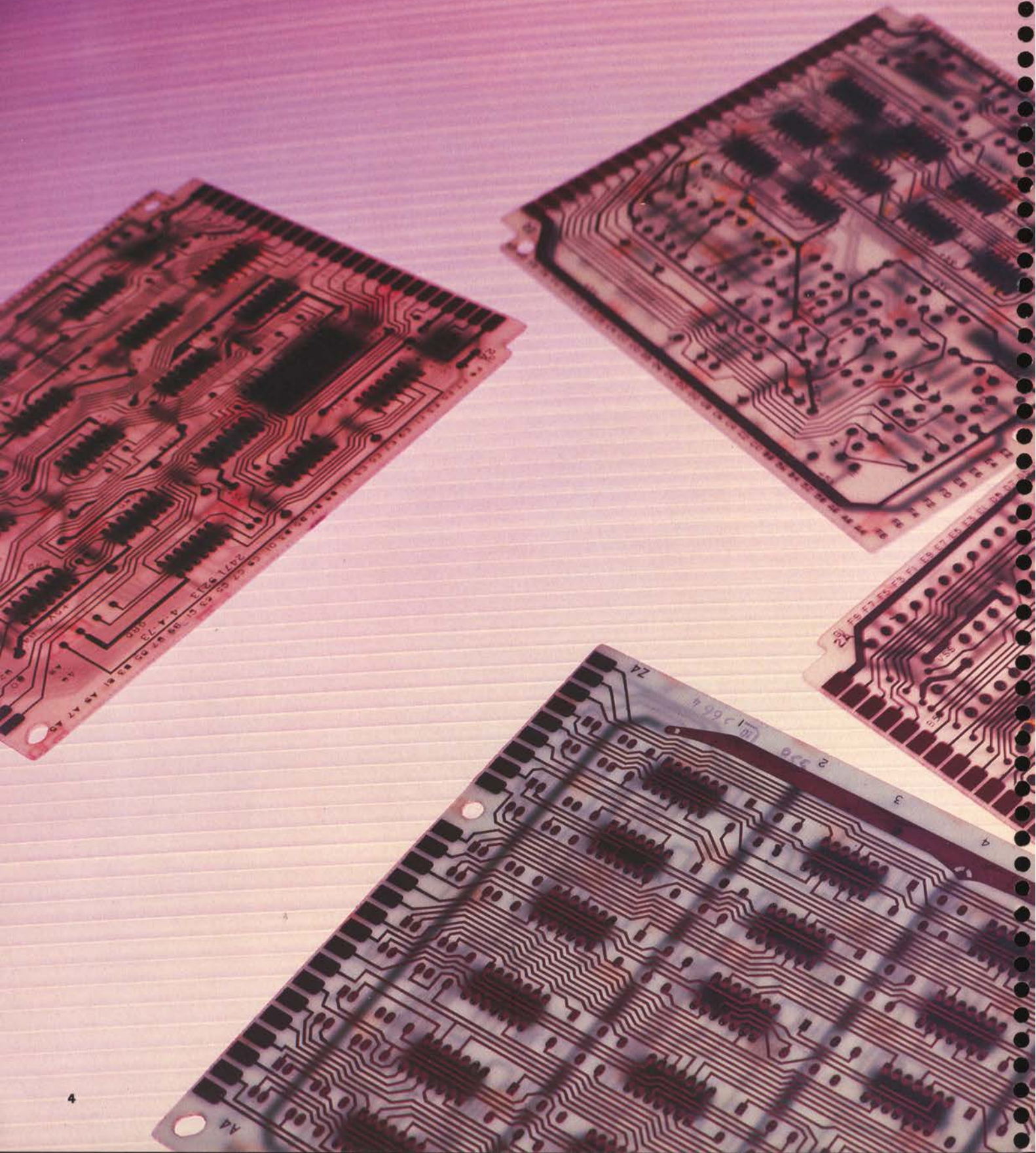
INTRODUCTION



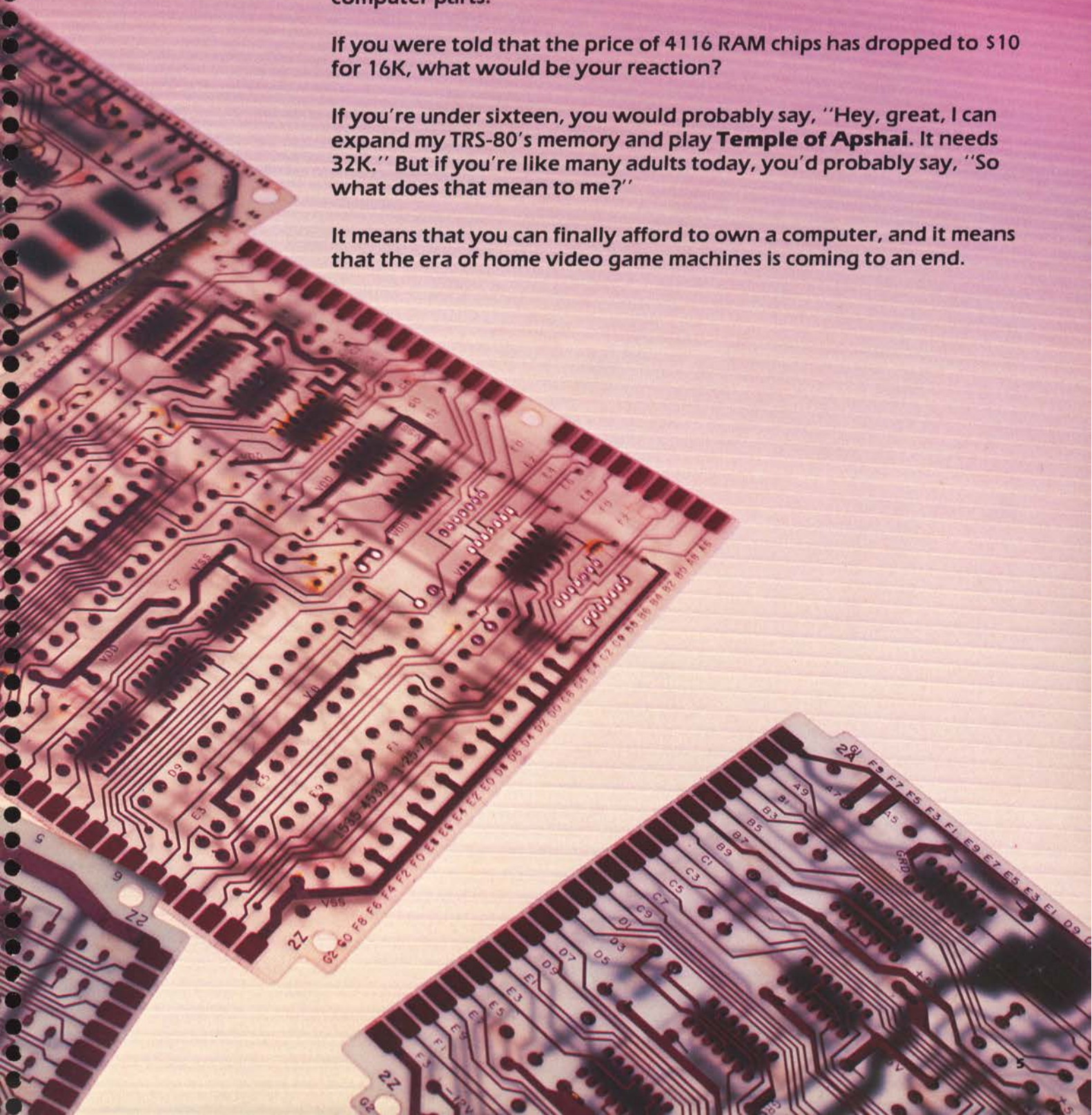
It has all happened so quickly. Games for today's home computers are very sophisticated, yet they have existed only a short time. Some classics of the industry have already emerged, and this book is about those games.

Personal computers, home computers on which many games can be played, appeared on the retail market suddenly. One major reason for the flurry of activity in microcomputing has been the dropping cost of computer parts.

If you were told that the price of 4116 RAM chips has dropped to $10 for 16K, what would be your reaction?

If you're under sixteen, you would probably say, "Hey, great, I can expand my TRS-80's memory and play **Temple of Apshai**. It needs 32K." But if you're like many adults today, you'd probably say, "So what does that mean to me?"

It means that you can finally afford to own a computer, and it means that the era of home video game machines is coming to an end.



RAM chips are memory chips; their capacity is the work capacity of the computer. Since the power of a computer is limited by its memory, the more memory chips you put into a machine, the more you can do with the machine. The larger the memory, the more complicated the graphics, sound, and games the computer can produce.

As recently as 1981, the 4116 RAM cost over $100 for one set (16K) of memory. Accordingly, computer manufacturers had to charge high prices for their machines. The price of an Atari 400 computer with twenty-four 4116 chips (48K), for example, was $600. Now the Atari 400 costs about $200, and with the many discounts and rebates, the price is still falling. Many video game systems which can only be used for game playing sell for about $200 as well, creating a notable contrast in what you get for the money.

Video games have progressed from the very early "Pong" versions to the ultra-sophisticated Colecovision unit. They too were affected by the high cost of memory; for instance, the Atari VCS machine (designed in 1977) had only 128 bytes of memory, compared to some 48,000 in the Atari 400 computer. The limited memory of most game machines meant poor graphics, crude sound, and limited usefulness; but the machines provided the best home access to video games that could be manufactured at the time for a reasonably low cost.

Now that the cost of computer memory has declined so dramatically and a game machine costs about the same as a full-fledged computer, it is just as economical to buy the latter as the former.

Is a home computer a good gaming machine? Yes, if you pick the right one. In fact, there are some computers that are superior for game playing to any gaming machine on the market, for about the same price; and they can be used for so many more purposes.

One would think that more game software would be available for a game machine than for a home computer, but this is not the case. Only very new models of home computers have a software base as limited as that of a typical game machine. And the Apple IIe computer has far more game programs available for it than the Atari VCS, Intellevision, Coleco, and Bally machines put together. Why?

Developing video game cartridges is a real science, requiring the best specialized programmers, specific hardware, and a lot of money. Usually, only large companies like Atari or Coleco can afford to make cartridges for game machines. On the other hand, home computers are becoming very popular and their software can easily be distributed on all sorts of computer media (like disks or cassettes). Consequently, where only a very limited base of professional software developers produce game cartridges, a wide base of programmers are designing games for home computers.

Today's home computers feature a lot of computer memory (allowing excellent graphics and sound). Game quality on computers is usually superior to that on home video game systems. A typical game on the Atari 400 looks and sounds far better than any game on the Atari VCS. Commodore, Apple, and IBM all offer very high-quality color graphics and animation, as well as complex sound generation mechanisms. These are truly excellent gaming machines.

Home video games were popular for a time, when memory was expensive and before the boom in home computer software had occurred. That time is now over, and home computers are a better investment than video game systems—for nearly anyone. As a game player, you will come out ahead by buying a real computer. And computers provide advantages in other areas, too.

A wide variety of "canned" programs are available to help you use the computer around the house—from checkbook balancing programs to mileage recorders and file organizers. There are even recipe storage programs for those of you who are still using the old shoebox method.

Educational software for home computers is increasingly available, too.

You can give your children a head start by letting them learn about computers at home. They are growing up in the computer age, and if they understand computers, their chances for success in school and in the job market will be much greater. Computer assisted instruction (teaching by computer) is an exciting development. Children especially enjoy learning from a machine. They are taught on a one-on-one basis, rather than in the usual thirty-to-one ratio of a classroom. Most schools have recognized this and are implementing computer education programs, but your child's school may not have done so yet. Computers are powerful tools that can be of particular benefit to growing children.

Children take to computers like ducks to water; unlike most adults, they haven't yet learned prejudice or fear. Some of the best programmers are under fifteen years old and can outprogram the "experts" at Atari. For example, the Atari Program Exchange (APX) catalog features a game called **Caverns of Mars,** which was written by a teenager. Atari was so impressed with the game that it has become a mainline product.

By now you have probably thought of many reasons of your own for buying a home computer. But it can be very difficult to decide which computer to buy, so here are some suggestions about how to arrive at that decision:

1. Keep in mind that when you ask a computer owner which one he or she recommends, you are likely to hear something more closely resembling a religious zealot's harangue than a rational statement. Computer owners often become very attached to their machines and will argue endlessly about their superiority. This also tends to apply to computer salespeople. Expect this, and you won't be surprised when you are told that every machine on the market is superior to every other machine.

2. Look for a computer that will do more than just play games. Sooner or later everyone gets the itch to learn how a computer works, so you should have a computer that you can program and about which you can learn without becoming frustrated.

3. Look for computer characteristics you like. Just because you like a machine doesn't mean that others will. It's a lot like buying stereo speakers: everyone's ears are different, so everyone will have a different preference. Is the TV display fuzzy to your eyes? Is the keyboard easy to type on (or will it give you finger cramps inside the hour)? Are the joysticks good (or do they have a limp, unresponsive feel)? Look for a computer you will enjoy working with for many hours. That is far more important than the number of expansion slots the machine has or any other technical features.

4. Remember that in the long run, software (the programs) will cost you more than hardware (the electrical parts). Be aware that without software, your computer is nothing but a paperweight. Just as you wouldn't buy a car that runs on gasohol if there are no filling stations nearby that carry that fuel, you shouldn't buy a computer that has no software available. Bear in mind, however, that this situation changes gradually as more programs are written for different machines.

5. Try several games on the machine you're considering while you are at the store. Since you will probably be shown the best games that are offered, you'd better not buy the machine if you don't like them. Are the graphics exciting? Is the sound good? Are the games fun? These are the marks of a good gaming machine.

6. Game software comes in several formats, primarily cassette tape, diskette, and cartridge. For cartridges, you need only the computer; for cassettes, you need a tape drive; and for diskettes, you must have a disk drive. The disk drive can cost you more than the computer. Cartridges tend to be relatively expensive (because they are made of plastic molding and other hardware) and somewhat limited in complexity (due to the amount of room inside for storing a program). So plan to buy few cartridges and lots of tapes or disks. In order to use most of the available game software, you will need at least a cassette tape drive—because most popular games are available on tape.

7. Many games require 48K of memory, and if you only have 16K in your machine, they will not work. When you buy software, be aware that many games are available for more than one machine; check to be sure that you buy the tape or disk for the correct machine and memory size.

8. You will probably want a joystick and/or paddles for your computer. There are many alternatives. Wico makes a fine joystick for the Atari, for instance, and there are many others. Shop around. It will be your hands using the controls, so find controls that you like, that feel right and play right for you. You may find that the less expensive Atari joysticks are just fine and work better for you than an expensive third party model. When buying a game, be sure you have all the necessary peripherals (such as joysticks or paddles). Some games require them, and some do not; check the packaging. In general, playing a game with a joystick is more enjoyable than playing it on a keyboard, even if the keyboard option is offered.

9. You will probably be encouraged to buy a monitor. A monitor is just a TV without the receiving circuitry. Theoretically a monitor will give you a cleaner video picture than a TV; in practice, however, a good TV will match a monitor for almost any application—especially for games. Save your money, unless a monitor is absolutely required (as one is for a word processor with an 80-column display). Buy a good TV instead, so you can do something with it when the computer is off. Take your computer with you when you go shopping for a television set; some TVs do not reproduce computer-generated images well, and some do. The TVs that do are not necessarily the ones that look good with regular pictures.

If you endure the process of becoming computer-literate enough to buy a machine, you will be joining the ranks of many other people who have computers. You will be buying, not a dead-end video game, but a chance to learn about computers.

It's worth the trouble. You'll have a great game machine and a computer all in one—a powerful combination.

HARDWARE: AN INTRODUCTION

You don't have to be a hardware expert to play games on your home computer. In fact, the opposite is true. Many of today's hardware experts learned about computers through computer gaming. So don't fret if you don't know what a byte is, or what RAM stands for—many racing drivers for that matter wouldn't know how to rebuild a transmission, either.

A certain amount of practical hardware knowledge is useful to gamers, however. If you know a few things about the machinery, you can save yourself from making expensive mistakes—like buying a game you can't play on your system, or erasing a diskette accidentally. Here is a list of terms that will come in handy when discussing, reading about, or shopping for home microcomputers:

BASIC: Stands for **B**eginner's **A**ll-purpose **S**ymbolic **I**nstruction **C**ode. BASIC is a very user-friendly computer language that is common to most home systems.

Boot The System: Means turn the computer on. It can also include inserting a disk into the disk drive ("boot the disk").

Byte: Refers to a unit of memory. A byte is enough memory space to store one character, letter or numeral. A computer with 16K bytes of memory will hold approximately 16-thousand characters.

Cartridge: One method of storing computer games. Instead of loading a program off of a floppy disk or cassette tape, you simply plug a cartridge into the computer. Not all computers accept cartridge games, and each system that does has its own type.

Cassette Tape: One method of storing computer games. The information is stored on audio-style cassette tape, in the form of magnetic fields, and played on a tape drive.

Cassette Tape Drive: An audio tape player used to access information stored on cassette tape.

CP/M: Stands for **C**ontrol **P**rogram for **M**icrocomputers. CP/M is an operating system that can be used by many types of home computers. It is best used for non-gaming applications.

Disk (or Diskette): Usually refers to a floppy disk—another method of storing computer games and other programs. The information is recorded magnetically on the surface of the disk and retrieved through a disk drive.

Disk Drive: A device that uses tiny magnetic heads to access information stored on a disk, much like the stylus playing a phonograph record.

Double Density: Refers to how tightly data is stored on a disk. If you buy a double density disk, you must have a disk drive rated for double density and the software to run it. Do not use double density disks if you have a single density disk drive; they cost more and this would be like using premium gasoline in a car that runs fine on regular.

Hardware: Includes the physical components of a computer system. The central processor, keyboard, monitor, and disk drive that make up your system are all examples of hardware.

K: The metric symbol for the number "1000." It usually indicates the capacity of a computer memory: a 16K computer has approximately 16,000 bytes of memory.

Language: Refers to the vocabulary used to communicate with a computer. A computer language is a set of coded commands that instructs the computer to perform specific tasks. BASIC is one of many computer languages.

Memory: Determines how much information can be stored and/or used at one time.

Modem: An acronym for **mo**dulator-**dem**odulator, a device that permits computers to communicate with one another over telephone lines.

Monitor: A display unit that resembles a television, but lacks the apparatus necessary to detect UHF/VHF frequencies. The monitor displays the work your computer is doing (or the game you are playing).

Peripherals: Any devices that attach to the original computer system. Examples are joysticks, printers, light pens, paddles, and disk drives.

Program: Refers to a sequence of instructions which command the computer to perform specific functions or tasks. Programs are also called "software."

RAM: Stands for **R**andom **A**ccess **M**emory. This is the memory storage area of a computer that you can use to read data from (or program data into) the computer. **(Compare with ROM.)**

Reset: A button found on most microcomputers that translates to "get out of jail free." You will almost never use this button except to exit a game by force. It is sometimes the same as turning the machine off then on again.

ROM: Stands for **R**ead **O**nly **M**emory. ROM is the internal memory of your computer that cannot be altered; it is the permanent circuitry that is installed when the computer is manufactured.

Software: Refers to programs or instructions that tell the computer what tasks to perform. The information stored on disk or tape is software.

As you can see from these definitions, games are generally stored in one of three ways: cassette tape, diskette, or cartridge. In order to use a cassette tape, you need a cassette tape drive. To use a diskette, you need a disk drive. Disk drives are considerably more expensive than tape drives, but they are also much faster and more reliable. Cartridge games simply plug into a port on the machine and require no special equipment. Cartridge games are generally "safer" than games stored on tape or diskette, because they can't be accidentally erased or damaged easily.

Cassette tapes are relatively sturdy due to their plastic casings. Diskettes, however, must be handled more carefully. Remember that your computer program is not printed on the disk; it is stored as magnetic fields. If the disk (or tape) is near another magnetic field, the stored program will be erased. Since most of us seldom handle magnets, you may not consider this much of a problem; but consider this: everything electrical generates a magnetic field. Your television, telephone, and computer are all capable of erasing a disk. Never place a disk or tape closer than six inches to anything electrical.

Be aware that the program is stored on the **back** side of the disk. Many people put disks down, without the dust jacket on, with the label face up. This grinds dust into the actual program storage area. One grain of dust embedded in the disk can render it useless. Keep your disks in their jackets when they're not in the drive.

Taking care of your tape player or disk drive is also very important. Keep the playing heads of the tape drive clean with denatured alcohol or a "head cleaning kit" available from computer and audio stores. Disk drives should be cleaned by a professional at a computer store. Think twice about using advertised "cleaning disks." Some disk drives—especially the Atari—will not survive the abrasive action of these head cleaners.

Disks and tapes are almost never compatible between machines. A tape for an Apple computer will not run on an Atari computer. There may even be differences between models; a Radio Shack TRS-80® Model I, for example, uses a 5-inch disk, whereas a TRS-80® Model II uses an 8-inch disk. When you buy a game, make sure it is compatible with your machine and model.

You must also make certain that your computer has enough memory to play the game you select. A computer game is actually just a computer program. It is loaded from the tape or disk into computer memory. Almost all computer games specify the amount of memory required (in units of "K") on their packages. Be certain that the game you select doesn't require more memory than your computer has. Having too much memory is never a problem with home computers, and extra memory can be an inexpensive way to improve your computer's performance. Some of the more sophisticated games, like **Zork,** actually run faster with more than the recommended amount of memory.

Most games also require some sort of hand controller. Two of the most common are joysticks and paddles. Be certain that you select joysticks or paddles built for your machine; Atari joysticks, for instance, will not work on an IBM computer. You might want to check into buying joysticks and paddles built by companies other than the company that manufactured your computer. You should see your local computer dealer and try a wide selection of controllers until you find what's most comfortable for you.

Finally, most game manufacturers use on-screen color to help differentiate between elements, so most game graphics are designed to operate on a color television. If a color game is played on a black-and-white television or a monochrome monitor, it may dissolve into a blur of gray.

Armed with this general introduction to the language of the computer world, you should now be ready to venture into the stores. In the following pages, you will find specific information about some of the most popular home computers, and then a comparison of their values, which should help you decide which machine will be best for your own purposes—gaming and others.

APPLE COMPUTERS

Because the Apple II was readily expandable and relatively inexpensive, it became popular soon after its introduction. It was used for hundreds of applications, including games, by a variety of people with varying levels of computer knowledge. Apple Computer Inc. cleaned up the "rough edges," making the Apple II less intimidating to the uninitiated, and the machine grew from a "computer hobbyist's" toy into a "consumer's" tool.

The Apple II is a fine gaming machine with a large software base of computer games. The Apple's high price tag, however, and the recent introduction of less expensive systems with excellent graphics and sound, make it a good buy only if you plan to use its enormous library of non-gaming applications as well.

MODELS

First, there was the Apple I, which is now of interest only as a collector's item. Then came the (original) Apple II, the "Black Apple," (manufactured by Apple for Bell & Howell and so nicknamed for its distinctive charcoal-gray color), and the Apple II Plus. The ill-fated Apple III followed (with its terrible maintenance record) and has now been superseded by the Apple IIe ("e" for "enhanced"). All six models are basically the same machine, only with slightly different memory sizes and different immediately available languages. If you want an Apple computer, the Apple IIe is currently the best choice. It offers a larger memory than the others (64K versus the standard 48K of the Apple II and Apple II Plus), an improved (enhanced) keyboard, and software compatibility with the Apple II Plus.

BUILDING A GAME SYSTEM

The ultimate Apple gaming system consists of the following: an Apple IIe with 64K, Floating Point BASIC computer language (called Applesoft) which comes built in, one disk drive, a color television (or color monitor), and all the necessary hand controllers.

Apple II games are stored on diskette, so you will usually need at least one disk drive to run them. All Apple II disk drives are compatible with the new IIe, and they're relatively inexpensive. A number of independent manufacturers also market Apple "look-alike" disk drives (the Lobo or Rama brands, for example). You may want to compare the prices of these models with Apple disk drive prices; independent manufacturer's disk drives are often of high quality, and may provide a better deal.

A color television (or color monitor) plays an important part in the Apple IIe games. Color makes a big difference in the appeal of a game, and many games use the full range of color graphics offered by the Apple IIe. A color monitor costs more but works better with the Apple IIe than does a color TV; the extra TV components (tuners and filters) tend to decrease the color quality of the images generated. A color monitor is essentially a high-quality color television without the components of a regular color TV.

Independent manufacturers offer a wide variety of joysticks, paddles, track balls, and light pens for the Apple IIe. The controller is your most direct link with any game, so it's important to shop around for the type of controller you find most comfortable. One worthwhile device is Sirius Software Inc.'s "Joyport," which allows the Apple to accept a wide variety of controllers. The popular Atari joystick is also available for the Apple. For accuracy and intelligent design, the computer game controllers manufactured by TG Products excel. These add-ons are definitely worth investigating, so try them at your local computer store.

COST

An Apple IIe with the standard 64K memory sells for about $1400, with disk drives at about $500. Color monitors vary in price. An 80-column text card costs about $125, and a combined 80-column text card/64K RAM expansion card costs about $295. Currently, Apple is not manufacturing either cassette drives or modems, although these peripherals are available from independent manufacturers.

GAME SOFTWARE

Apple was the first company to offer a machine with sound and high-resolution (detailed) color graphics. Those capabilities made the Apple II a very attractive machine to early game designers, allowing them to create high-quality computer games for Apple computers. As a result, there are more computer games available for the Apple II Plus than for any other personal computer. And all of those games can be played on the Apple IIe.

Today, nearly every computer store has shelves filled with Apple software. If you buy an Apple IIe, you'll be able to find an endless variety of games for it—from simple **Tic-Tac-Toe** to the legendary **Zork** or **Wizardry.** And software is continually being produced because of the large number of Apples being sold. The market seems unlikely to go "stale" or slow down.

ADVANTAGES

The Apple IIe offers 64K of memory and a very functional keyboard. It also features good color graphics (capable of a wide variety of hues) and good sound (with a speaker which can make many interesting noises), but the major advantage of the Apple IIe over other home computers is the abundance of available software.

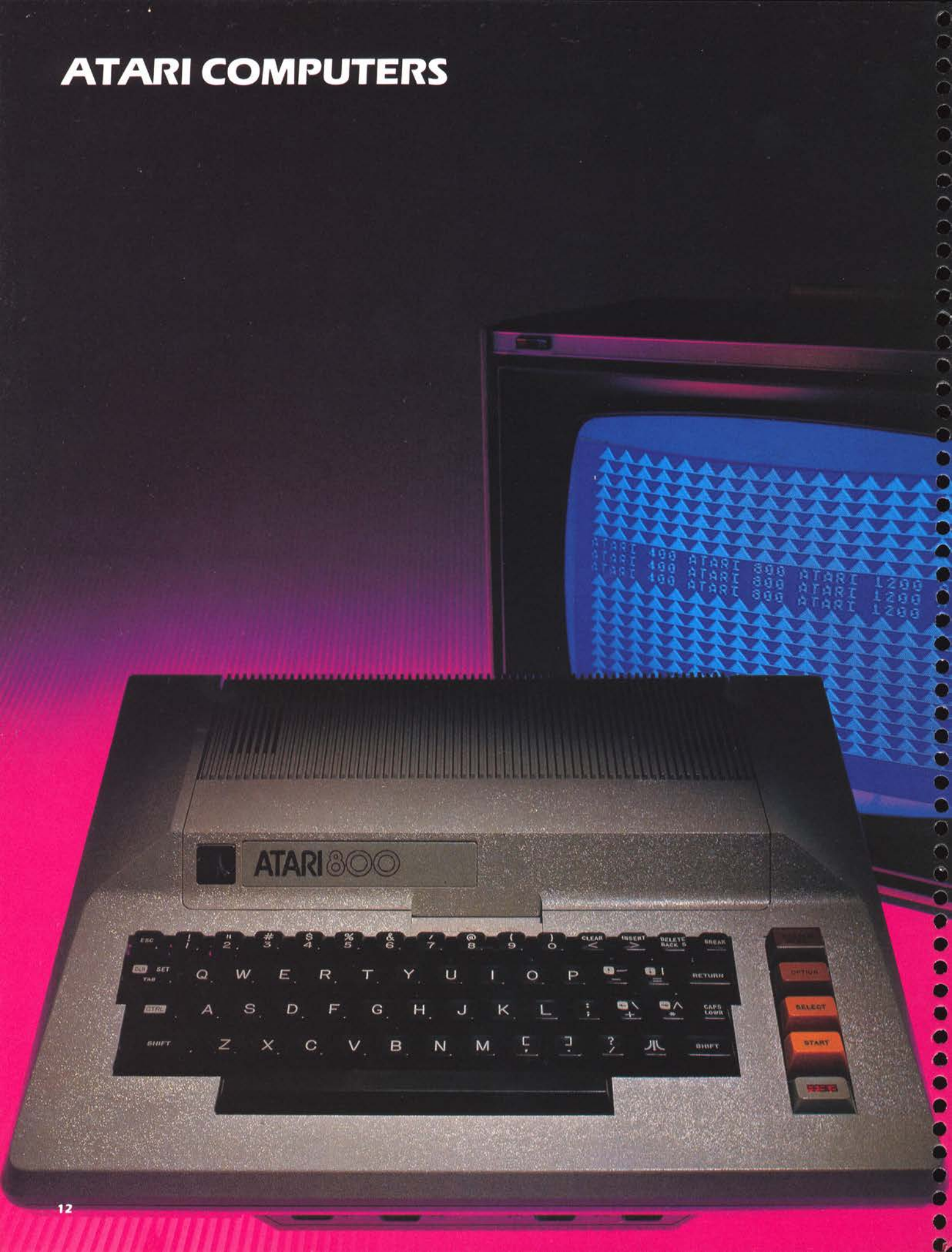
DISADVANTAGES

The Apple color graphics generation circuitry is not quite compatible with the average television, which results in color problems. And its sound quality, although good, has been surpassed by some of the newer computer systems.

WHAT ELSE CAN I DO WITH IT?

An Apple IIe has a wide variety of uses, thanks to the enormous software and hardware base available. If you buy an Apple IIe, you can use it for everything from sending messages nationwide to keeping daily records. Word processors, scientific calculators, sophisticated accounting packages, and many other options are available for the Apple. Several companies manufacture CP/M cards, devices that enable the Apple to use CP/M software. The CP/M software base is the largest available, and it is loaded with both educational and business packages. You can also use the Apple to learn programming, although Apple BASIC is not considered the friendliest BASIC language.

ATARI COMPUTERS



A company official once referred to the Atari machines as "home computing toasters." This "every appliance" idea pretty well sums up Atari's philosophy. Atari computers were designed as the first true home systems, with company policy backing this approach even to the extent of ignoring business applications. Atari computers are extremely user-friendly. The Atari home computers (especially the Atari 400) are strictly consumer machines, and they are among the most popular computer gaming systems available today.

MODELS

The Atari 400 and the Atari 800 are the original Atari home computers. The Atari 400 is a smaller machine physically, and it comes with a 16K memory. It has a membrane keyboard (a flat surface with non-movable keys drawn on it) which some people find difficult to type on. The Atari 800 is larger, has a touch-typing keyboard (good for programming), and comes with a 48K memory. Both accept disk drives, tape drives, or cartridge games.

The Atari 1200XL, introduced in 1983, did not sell as well as expected. Atari has announced the introduction of four new models: the 600XL (16K), the 800 XL (64K), the 1400 XL (64K), and the 1450 XLD (64K). These four new models should be available later in 1983. Software currently available for Atari machines should be compatible with the new hardware.

Of the currently available models, the Atari 400 is by far the best buy for gaming applications. Its memory is easily expandable to 48K, it has a huge software base, and provides a computer for the price of a game machine.

BUILDING A GAME SYSTEM

For an Atari system dedicated to gaming, the following set-up would be advisable: an Atari 400 (16K), an additional circuit board (for a total of 48K), a disk drive (preferably from an independent manufacturer, since Atari drives tend to be easily damaged), two joysticks, two paddles, and a color television.

While the Atari 400 comes equipped with 16K and most Atari games seem to work well with that much memory, an increasing number of games requires 32K (or even 48K) of memory. Some games, like **Zork**, can limp along on lower amounts, but they run much faster with more memory. Since memory is so cheap (under $100 for 48K), having 48K in your machine is worthwhile. Other companies manufacture a number of excellent memory boards for Atari computers in 32K and 48K sizes. Some good names are Axion, Mosaic, and Bit-3. These boards are generally cheaper than, yet every bit as good as the Atari-manufactured memory boards.

Atari games are available on either cassette or disk (as well as on cartridges). While the price of a tape drive (about $80) compared to that of a disk drive (about $500) may lead you to buy a cassette unit, loading cassettes is often a slow, frustrating experience, whereas disks are fast and relatively reliable. The problems associated with using a tape drive do not lie in the computer hardware: cassette tapes were simply not designed to be a computer storage medium.

Wico makes a fine joystick for Atari computers. Atari makes a good joystick, but it tends to wear out under hard use. The Atari paddles, by contrast, never seem to wear out.

COST

Atari 400 computers with 16K are now available for under $200; this is an excellent value. The Atari 800 with 48K can be purchased for under $600, and the Atari 1200 XL for under $900.

Atari disk drives cost approximately $500 each. Good disk drives from an independent manufacturer are considerably more expensive than the Atari disk drives, but also generally more reliable. Percom makes two excellent drives for the Atari system: a single density drive which sells for about $490, and a double density drive which sells for about $700. A tape drive costs comparatively little, about $80. 16K RAM expansion (800 only) costs about $100. A modem is available for approximately $200.

GAME SOFTWARE

As a game machine, the Atari 400 will not disappoint you. Its graphics and sound capabilities are among the most powerful on the home computer market. As a result, software manufacturers have designed many new games for the Atari and adapted most of the old favorites from the Apple and TRS-80 computers. There is now an enormous amount of game software for the Atari, with more coming.

The powerful nature of Atari computer graphics and sound capabilities means that Atari computers can duplicate all of the Apple or TRS-80 games; however, the reverse is not true. Those two machines can't match the capabilities of the Atari.

ADVANTAGES

Atari graphics and sound are superb, partly because the machines were designed for use with a color television. There is no other machine on the market that can match the Atari in the areas of graphics and sound.

DISADVANTAGES

As gaming machines, the Atari systems excel. However, they have few other applications. Accounting packages, for example, are in limited supply, and there are few other business packages. So don't expect to do much business, or other work with an Atari—it is a "home" computer, which right now means lots of games, although it can be used for some basics like checkbook balancing, recipe storage, gasoline mileage calculation, and car maintenance reminders.

WHAT ELSE CAN I DO WITH IT?

Don't rule out learning to program on an Atari computer. Atari offers a wide selection of languages, and the machine is friendly for programming. A number of powerful software tools are available to help you, and the manuals are reasonably clear. An Atari would be a fun machine on which to learn BASIC because so many interesting colors and sounds can be generated in the process.

Atari is investing heavily in the educational market. The Atari machines are excellent for teaching children, because they have fine communication capabilities. At present, this is a very new market, but look for more and more Atari educational software in the near future.

COMMODORE COMPUTERS

Commodore's first personal computer was the PET 2001. Introduced in 1977, it was sold primarily for use in schools and never became a popular "home" computer. Several years later, other kinds of Commodore business machines appeared, but more recently Commodore introduced two very interesting gaming computers: the VIC 20 and the Commodore 64.

The consensus among software manufacturers is that the Commodore machines are gaining popularity, so it won't be long before you'll be able to play virtually all of your favorite games on these systems. Add this growing software base to Commodore's sophisticated sound and graphics equipment—and relatively low price tag—and you have an exceptional bargain for home computer gaming.

MODELS

The VIC 20 is Commodore's smallest system. It comes with 5K of memory and features a full typewriter keyboard and eight programmable function keys. It can be expanded to 32K and accepts games on cartridges, as well as on disk or tape if you have a disk or tape drive.

The Commodore 64 is a more powerful machine, featuring a 64K memory and the same keyboard as the VIC 20. While the Commodore 64 accepts games on cartridges, disks, and cassettes as the VIC 20 does, games are **not** interchangeable between the two computers. The VIC 20, because of its low price, and large software base, is currently the better buy for gaming purposes: if you plan to do more than play games exclusively, however, perhaps using the computer more for personal finance and other data retrieval functions, then the larger memory capacity of the Commodore 64 may better suit your needs.

BUILDING A GAME SYSTEM

One advantage the Commodore computers have is their simplicity. To create a basic Commodore gaming system, all you need is a VIC 20 computer, a color monitor or TV, and your favorite controllers. If you want to expand your VIC 20 system, you can add more memory, and if you want to use games on tape or disk, you'll have to add a tape or disk drive.

Both Commodore models feature impressive compatibility with color television: as a result, you don't have to invest in an expensive color monitor to play high-quality graphic games on your Commodore system. Both the Commodore 64 and the VIC 20 also provide excellent game graphics and sound, although the Commodore 64's high-resolution graphics and fully synthesized sound may be more appealing than the VIC 20's capabilities.

Experimentation is still the best rule when choosing joysticks, paddles, track balls, and other controllers. You can get a pair of Commodore joysticks for about $20, but you'll probably be happier with controllers from an independent manufacturer (if you don't mind the extra cost). Visit your dealer and ask to try them.

COST

The VIC 20 generally sells for under $200 (and can be bought in some stores for as little as $89). The Commodore 64 currently sells for about $600, but it is available through many mass merchandisers for about $400. The Commodore tape drives are available for $60 – $75, and the disk drive for about $400. Expansion cartridges for the VIC 20 range from $40 to about $110. The VICMODEM, which can be used with either computer for access to telecommunications networks, costs about $110.

GAME SOFTWARE

About 300 games are presently available for the VIC 20, from Commodore as well as outside manufacturers like UMI, Tronix, and HES. Game quality is generally excellent, and ranges from learning games for young children, through challenging Bally/Midway arcade games like **Omega Race** and **Gorf**, to **Scott Adams Adventure Series** games that boggle the mind. The number of games available for the Commodore 64 is approaching 100 and growing rapidly.

ADVANTAGES

Clearly, the large library of computer games for Commodore computers is a major advantage for both the VIC 20 and the Commodore 64. They also feature impressively powerful graphics and sound capabilities. Both systems drive a color television about as far as possible with a small computer system. And the Commodore's sound synthesizer is a programmer's dream come true, since it offers all of the capabilities of a dedicated professional synthesizer.

Commodore's easy-to-use approach in providing comfortable keyboards and the low price of the VIC 20 make that system especially attractive to the computer novice. And the Commodore 64, while more expensive, is still a good buy, considering its memory size and potential for non-gaming applications.

DISADVANTAGES

The VIC 20 system is designed primarily for computer gaming, which is a disadvantage if you have more than a casual interest in non-gaming applications. The VIC 20 offers one computer language—BASIC—and business software, while available, is very limited. In short, if your primary interest is something other than gaming, you may quickly outgrow the VIC 20.

WHAT ELSE CAN I DO WITH IT?

Because of its low price, intelligent keyboard, and the promise of future peripherals, the VIC 20 is (and will be) a very good computer on which to learn programming. While the VIC 20's version of BASIC is the only Commodore language currently available, it is very user-friendly, enabling you to access many different colors and sounds. The more things you can do with a computer language when you first begin to use it the better, since this will influence how fast you learn it. The VIC 20 will be a very good machine with which to nurture this addiction if more languages become available.

A reasonably large library of business software is available for the Commodore 64, including word processors, spreadsheets, mail lists, and data base managers. Both the VIC 20 and the Commodore 64 are used extensively in schools, both for computer-assisted teaching and for teaching programming.

IBM COMPUTERS

The IBM name has long been synonymous with huge computing machines. With the advent of the microcomputer, however, many business and individual computer-users found that it was no longer necessary to lease computer time on a large IBM machine. It became possible (and practical) for many former IBM-users to execute their accounting, payroll, and other business functions with personal computers. Naturally enough, IBM decided to get into the microcomputer business to forestall the loss of small (and not-so-small) business customers.

The IBM PC (Personal Computer), represents a new approach for the company. It is not technologically startling or innovative—the components used are very common, and are even built by an outside manufacturer—and it uses another company's operating system: CP/M 86 or MS-DOS. Both of these things are very unusual for IBM.

The IBM PC is experiencing unparalleled sales. Many software companies predict that it will be the top-selling business computer for the next five to ten years. The IBM PC is an excellent business machine, and for that reason it is rather expensive—too expensive if you only intend to play games with it. But if you're looking for a first-rate business computer that also offers a fine selection of gaming software, the IBM PC is a good choice.

MODELS

There's only one IBM PC. While the system can handle up to 256K, the standard model comes with 64K of memory, which is plenty for most kinds of gaming. Other differences in the IBM system will be determined by the peripherals you order: color graphics boards, monitors, disk drives, modems, and game controls. There are enough of these extras to fill a book; deciding which ones you want or need can be like picking and choosing options for a new car.

BUILDING A GAME SYSTEM

To really play games well on the IBM PC, make certain that you have three things: a color monitor, a color graphics generator board, and a disk drive. Memory is no problem since the IBM comes standard with 64K—more than enough for almost any computer game.

The special plug-in circuit board that generates color graphics and the color monitor are essential for maximum graphic capability. Both are expensive but worth the investment; although neither is necessary for playing all computer games, color will make the games much more enjoyable.

The disk drive will significantly improve your gaming and non-gaming abilities. Its main advantages are speed and reliability.

Hand controllers for the IBM are relatively inexpensive. Be certain, however, that you find the most comfortable style and that you have the right adapters to fit the IBM.

COST

The IBM PC with 64K costs approximately $1500. The color generating circuit board goes for about $240, and a color monitor retails at about $600. A compatible disk drive can be purchased for around $300 (IBM does not manufacture a tape drive), and a modem is available for about $200. Since this represents a total investment of more than $2500, it would be wise to purchase this system only if gaming will be absolutely secondary to business applications.

GAME SOFTWARE

The IBM PC is still a new machine, which for most machines would mean that few or no games were available. But the IBM PC is not just any machine. In the relatively short time that it has been on the market, software manufacturers have converted many popular games for use on the IBM. The folks at Infocom, for instance, have translated **Zork**, **Starcross**, and **Deadline**; Adventure International has converted the twelve **Scott Adams Adventures**; and Microsoft has released a very good flight simulator with spectacular high-resolution color graphics.

Although the IBM's operating system is CP/M, it is a different kind of CP/M: CP/M 86. This means that software written for the original CP/M (CP/M 80) will not work with the IBM system. So be certain to look for games made specifically for the IBM PC. In addition, avoid games which need more hardware than you have. Some games, for example, require the high-resolution color monitor and graphics board.

ADVANTAGES

The advantages of owning an IBM PC are many, but few of them have anything to do with gaming. Few personal computers can compare with the IBM for business applications. Its CP/M 86 operating system runs an enormous selection of business packages. If you buy an IBM PC for business purposes, it can also have gaming advantages. It offers superb (though expensive) color graphics, good sound, and a growing library of game software.

DISADVANTAGES

The major disadvantages of the IBM PC are economic: its basic system and add-ons are all expensive. The IBM PC should be out of the question as a gaming-only machine.

WHAT ELSE CAN I DO WITH IT?

You can do almost anything with it. A wealth of business packages which use its operating system are available. Accounting, scheduling, payroll, or anything else you might need to run your home or small business are at your fingertips.

RADIO SHACK COMPUTERS

Some computers are marketed in very serious ways, with the capabilities for game playing not being promoted at all. By contrast, Radio Shack has consistently presented the TRS-80 Color Computer as both an entertainment machine and a computer for practical use. For the person who wants a microprocessor for play only, the machine's power is useful (because its efficiency enhances game playing), but the Color Computer is a bona fide computer and a powerful one.

MODELS

Radio Shack introduced the Color Computer in 1979, and it was eagerly embraced by the public. The basic design has not changed since then; it has a standard typewriter keyboard along with some special keys. Radio Shack offers three varieties of TRS-80 Color Computer, differing in amounts of memory and in degrees of graphics sophistication: the 16K standard Color Computer, the 16K Extended BASIC Color Computer, and the 32K Extended BASIC Color Computer.

COST

The 16K Extended Color BASIC machine (about $300) is the standard for most owners, and most available games require at least 16K of computer memory. The 16K standard Color Computer costs about $200, and the 32K Extended BASIC Color Computer sells for about $400. If you choose to add disk drives, the first will cost about $600, the second about $400. A tape drive can be purchased for around $60, and Radio Shack offers the Modem I (costs about $150), and the Modem II (about $250).

BUILDING A GAME SYSTEM

Add a color monitor (or color TV set) and a pair of joysticks (about $25) to the 16K Extended BASIC unit and you'll be ready to play.

The unit has an opening for cartridges, which offer the most sophisticated and expensive games for the TRS-80 machines, but you may also want to invest in a cassette tape player for access to a wider variety of programs.

Radio Shack sells a color monitor for about $400. However, the Color Computer will display games and other programs on any TV.

Add-ons abound for the Color Computer. These include printers, phone modems, and others.

The TRS-80 Color Computer will display nine colors. It also displays all the letters and figures on the keyboard, so that what you type is shown on the screen. And the Color Computer has sound: 255 tones which can be programmed as music and sound effects. These are electronic sounds, a bit tinny, but well given to experimental music and the "bells and whistles" of programs. In Extended Color BASIC, there are commands which simplify music programming, and the results can be quite sophisticated, though not an orchestral simulation. Only one sound is produced at a time, and when sound is generated, the graphic or text part of the game halts.

GAME SOFTWARE

Hundreds of games are available for the CoCo, as devotees of the TRS-80 Color Computer call it. The games come on cartridges, cassettes, and disks. There are games for all budgets, from the $30 and $40 games marketed by industry giants down to the type-it-yourself listings in magazines. The pleasure of computer gaming on a true computer is that the user is not limited to expensive software and may explore a wide range of games on a modest budget.

Radio Shack games lean heavily toward arcade activities such as **Clowns and Balloons** and **Galactic Attack**. Radio Shack will supply you with a small program catalog for the Color Computer. The current catalog contains a list of 46 programs, most of them games on cartridges.

Be wary in mail order shopping for computer games. Ads often contain large colorful illustrations suggesting the action of the game. A good ad will include a photograph of a screen with the game displayed.

Computer stores other than Radio Shack will carry some but not much software for the Color Computer. Such computer stores and even some bookstores stock books and magazines catering to the Color Computer user. The magazines print game listings and provide more opportunity for shopping for games.

With the Color Computer, the best game of all may be the slow, somewhat addicting process of learning computer programming.

ADVANTAGES

Software availability for the TRS-80 Color Computer is good. Even small cities have Radio Shack outlets with a good range of material, and the determined user can find non-Radio Shack programs, increasingly, at computer stores as software and at bookstores as listings in magazines and books.

Repair availability is also good. Radio Shack has established a network of computer stores, many of which have on-premises repair personnel.

Beyond Radio Shack, a remarkably large force of backup exists. Independent software manufacturers, magazines, and books are available beyond any user's budget.

DISADVANTAGES

Among available computers, the CoCo has one of the worst keyboards. The keyboard does not have the "feel" of an electric typewriter, and it takes some getting used to.

WHAT ELSE CAN I DO WITH IT?

Without any additional purchase, you can learn to write programs for personal use. BASIC is not difficult to learn.

With a printer and the right software, you can do word processing (typing and correcting your message on the TV screen, then printing it on paper). This can speed a lot of correspondence and report writing.

With a modem you can hook into national information services, such as Compuserve and Dow Jones.

The wide range of household, education, and financial programs can turn the CoCo into a tool which saves time and performs tasks efficiently.

TEXAS INSTRUMENTS COMPUTERS

Texas Instruments' first home computer, the TI 99/4, was introduced in 1977. It had 16K and a price tag of over $1000. It had a poorly designed keyboard that made serious programming impractical, and it had an unusual processor—a questionable technological choice by Texas Instruments that hampered the development of software by independent companies. The system never became popular.

After losing a lot of money on the TI 99/4, Texas Instruments went to work on developing a new product: the TI 99/4A. They maintained the same processor (TMS 9900) and designed a functional touch-type keyboard. They also cut the price drastically, offered generous rebates, and hired Bill Cosby to do their television commercials.

Because the TI 99/4A uses the same processor as the original TI 99/4 (a processor used in few other computers), very few game designers are programming software for it. The games that are available, therefore, come almost exclusively from Texas Instruments. The exception to this rule is the Expander series of games from Milton Bradley, which promise to provide some of the most innovative game-playing available on any computer—innovative because the games will allow players to control game action by using spoken commands, thereby allowing them to interact that much more closely with their machines. The Expander games are due to appear nationally later this year.

There are also a number of very interesting peripherals available for the TI system. These factors, combined with a rather low price (about $150), make the TI 99/4A worth consideration as a gaming computer.

MODELS

There is only one model—the TI 99/4A. The original TI 99/4 is no longer being manufactured. The TI 99/4A comes with a 16K memory and a touch-type keyboard.

BUILDING A GAME SYSTEM

The beauty of the TI 99/4A is that nearly everything required for gaming comes in one package. All you need for a basic set-up is the TI 99/4A with 16K of memory, a color television, and two joysticks.

Although the TI 99/4A can be expanded to 32K, nearly all of the Texas Instruments game cartridges perform adequately with 16K. And because nearly all of the games come in cartridge form, you won't have to invest in a disk drive.

The TI 99/4A also eliminates the need for an expensive color monitor; the microchip that generates color for this system is very compatible with color television. The Texas Instruments joysticks are well matched with the TI 99/4A. As a general rule for selecting controllers though, always remember to try before you buy.

Your final consideration in building a TI 99/4A gaming system might be the purchase of a good voice synthesizer. The best choice will probably be Milton Bradley's Expander, which not only offers voice synthesis but a process called "voice recognition," which will allow the player to give direct verbal commands to the Milton Bradley games. The Expander set-up includes a 64-position keypad with overlays for each of their games, a joystick, and a microphone-headset. The complete package will probably cost in the neighborhood of $100.

COST

The TI 99/4A retails for about $150 (and from June 1, 1983 through the end of the year Texas Instruments will be offering a $50 rebate on this retail price). Peripherals for the TI 99/4A, on the other hand, are less reasonably priced when compared to the competition. A tape drive isn't too bad, costing about $70, but your first disk drive will cost around $650. A 32K expansion card costs approximately $300, an acoustic modem around $200, and TI's own voice synthesizer cost about $150.

GAME SOFTWARE

Games from Texas Instruments for the TI 99/4A feature very good color graphics and sound capabilities. They also represent a wide variety of game categories (maze, space, adventure, etc.). And Milton Bradley is expanding the TI 99/4A's software base with a line of voice recognition games designed to go with their new Expander.

ADVANTAGES

The strongest point in favor of the TI 99/4A is that it's inexpensive and easy to use: just plug in a cartridge and go! A second advantage is that the games offered by Texas Instruments are of competitive quality and those offered by Millton Bradley are strikingly different.

DISADVANTAGES

The biggest factor working against the TI 99/4A is that almost no independent game designers program software for it. Peripherals are also a trifle expensive, and another consideration is that Texas Instruments' standard version of BASIC is painfully slow, which makes programming less enjoyable than on other machines (although this can be remedied with the purchase, for about $100, of a cartridge that will equip your 99/4A to process TI Extended BASIC, a language which is much easier to use).

WHAT ELSE CAN I DO WITH IT?

For non-gaming applications, the TI 99/4A performs best on easy "home" functions. There are a number of programs available for balancing your checkbook, storing recipes, and other comparable functions, in addition to a large quantity of educational programs.

HARDWARE: RATING THE SYSTEMS

This comparative evaluation is in three sections. The first section compares the machines' value for a person who wants a computer only for game-playing. The second is for someone who wants a 50 — 50 mix of game and home/business applications. The third is for a business-oriented person who is only looking for a few gaming capabilities. The computers reviewed in this book are rated against each other in these three categories.

The computers are listed in order (from best to worst) in terms of cost, software availability, and capabilities. Specific comments are made in each category for each machine.

Group 1: Gaming Only
Listing in order of suitability:

Atari 400/800
Commodore VIC 20
Commodore 64
Apple IIe
Radio Shack TRS-80 Color Computer
Texas Instruments TI 99/4A
IBM PC

The Atari computers are the most impressive gaming machines available today for the lowest cost. They offer the best graphics, quality sound, and a wide range of available software.

The Commodore VIC 20 is as good a game machine as is on the market, standing up quite well to the Atari, for example. And it is very inexpensive. More and more software is becoming available (mostly from third party manufacturers), but in this one area the VIC 20 still lags behind the Atari computers.

The Commodore 64 is also a good gaming machine, but it costs quite a bit more—enough to make you think twice about buying it only for game-playing.

A standard Apple IIe costs far more than any of the Atari or Commodore computers, but its software base is tremendous—the best of any of the machines covered. It also features good graphics and fair sound.

There are a reasonable number of very good games available for the Radio Shack TRS-80 Color Computer, but again, its cost relative to the others is rather high.

The Texas Instruments TI 99/4A has good sound and color graphics, but the quantity of game software is not very impressive. This may change in the future, however, because Texas Instruments has recently made an arrangement with Imagic, one of the most innovative game manufacturers out there, to develop some new games.

The IBM PC is really a business machine, so if you really only want a game machine you'd be paying far too much by buying one. However, if you're really buying a computer for business use and you also want to play games, be encouraged. IBM has attracted some of the most creative game designers in the country, and plenty of game software is being manufactured.

Group 2: 50—50 Mix of Game and Home/Business Applications
Listing in order of suitability:

Apple IIe
Radio Shack TRS-80 Color Computer
IBM PC
Atari 400/800
Commodore 64
Texas Instruments TI 99/4A
Commodore VIC 20

The primary consideration in this category is the quality and quantity of software available for both home/business and gaming applications.

The Apple IIe and the Radio Shack TRS-80 Color Computer both have extremely large software bases for both applications. The IBM PC has a large business software base and a growing game base.

The Texas Instruments TI 99/4A and the Commodore computers have small software bases in both game and home/business applications. In addition, the Commodore, TI 99/4A, and Atari machines are limited to fewer than 40 columns of displayed characters across the screen, which is a severe limitation for business applications.

Group 3: Primarily Business Applications
Listing in order of suitability:

IBM PC
Apple IIe
Radio Shack TRS-80 Color Computer
Atari 400/800
Commodore 64
Texas Instruments TI 99/4A
Commodore VIC 20

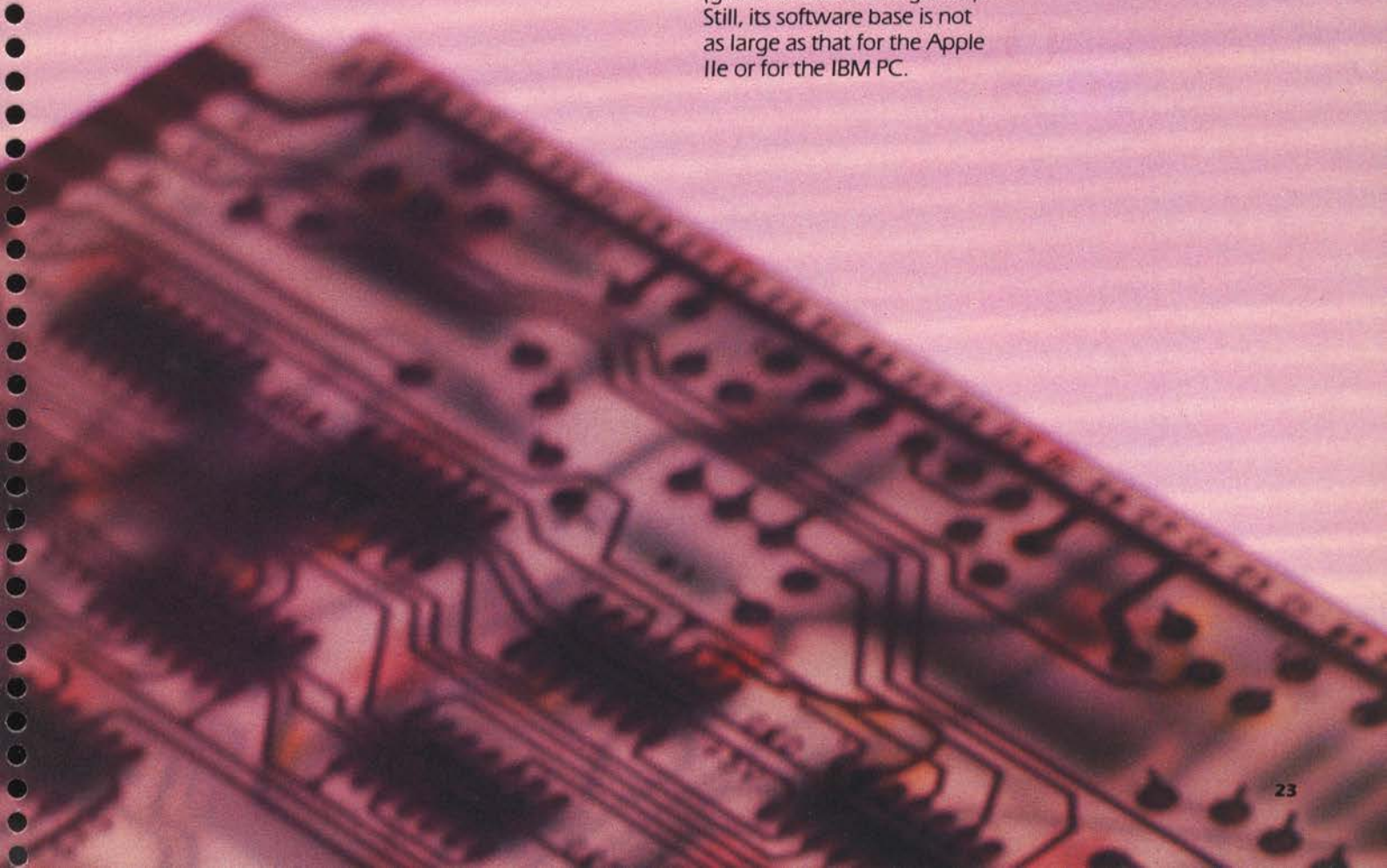
The IBM PC is the clear winner in this category, with a large and growing game software base and a design intended primarily for business use.

The Apple IIe has a large business software base, but is not primarily business-oriented.

The Radio Shack TRS-80 Color Computer is a good business machine, with particularly good color graphics (good for charts and games). Still, its software base is not as large as that for the Apple IIe or for the IBM PC.

The only real reason to buy an Atari computer for business use is that it is initially very inexpensive. And if its limited display (and memory, unless you expand it) is adequate for your purposes, the Atari can be a fine, inexpensive business machine. Unfortunately, you may have to do most of your own programming; there is little business software available.

The Commodore computers and the Texas Instruments TI 99/4A share the common problems of limited screen display and limited software. The VIC 20 also has a very small memory for business applications, with only a moderate amount of memory-expansion possible.



GAME TYPE I:

ADVENTURE GAMES

Every now and then someone comes up with a completely fresh idea. When such ideas catch on, they often spawn a whole new genre. Good examples are author J. R. R. Tolkien's trilogy, **The Lord of the Rings,** and, in a different medium, Crowther and Woods' epic computer game **Adventure—The Colossal Cave.**

The Colossal Cave is an adventure text game invented in the mid-1970s on a very large computer. As individual players added their own ideas, the adventure game phenomenon quickly spread across the country. Soon every respectable computer installation had the Original Adventure (as it is now reverently known by computer gamers).

Crowther and Woods were the first to create a convoluted computer world through which the player actually travels. The computer recognizes simple commands which you type on the keyboard to tell the computer what you want to do within its "reality" (the adventure world). In response, the computer tells you the consequences of your actions.

For example, the computer informs you that you are in a room with a battery-powered lantern. You type in **GET LANTERN.** The computer, acting as an omniscient referee in this world, now knows you have a lantern. Later, when you are deep in the dark Cave, you type in **LIGHT LAMP**—and there is light.

If you do not have a light, you tend to fall into pits and die. The Cave, you see, is magical. Within its dark passages are the many treasures which you must recover for points. You must also solve a number of difficult mysteries along the way.

On-screen descriptions of the Original Adventure's imaginary world are spectacular. They help you form a mental image of where you are playing, and they add to the fun of the game. Some even wax poetic; the "view of the roaring volcano" is a vivid image indeed.

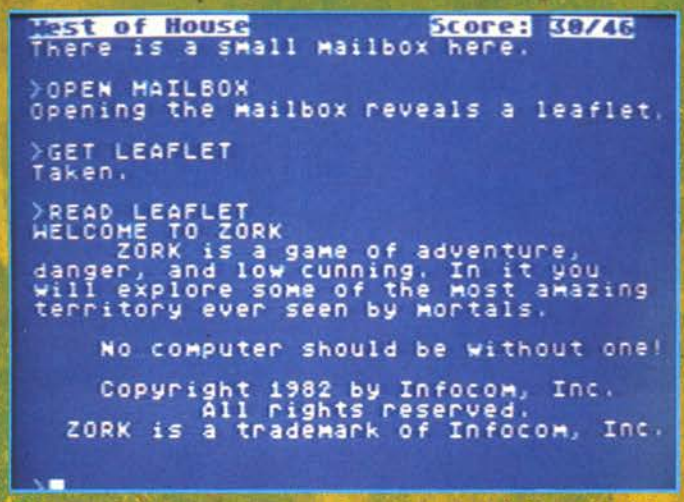
Other adventure games soon appeared. In the beginning, new puzzles were added to the Original Adventure, but eventually completely new adventures and computer fantasy worlds emerged. Each new adventure offered a more intricate world than the last, with more challenging puzzles and deadlier enemies. Scott Adams descended in force with twelve superb adventures, each with a wildly different setting or theme—caves, pirates, even a "Mission: Impossible" adventure. Extremely popular, the **Scott Adams Adventures** are now considered classics.

Eventually, pictures took the place of words and On-Line Systems introduced **Hi-Res Adventures** (with high-resolution graphics), in which a picture is drawn for each situation described in the text. There are now five **Hi-Res Adventures**, all classics and all fun.

Finally, the designers from the Infocom company introduced the ultimate adventure text game—**Zork.** Read on to discover why **Zork**'s complex world, imaginative puzzles, and creative text have made it the best adventure game available.

THE BEST ADVENTURE GAME:

ZORK



This opening screen shows you how the game is played, with examples of commands. Zork is full of detail—the screen above shows you what you'll find if you open the mailbox that is west of the house.

Sometimes when you have been killed the computer will have mercy.

From: Infocom Inc.
For: Apple IIe/Plus, Atari 400/800, Commodore 64, IBM PC.
Format: Disk
Requirements: Disk drive; Apple, 32K; Atari, 32K; IBM PC, 48K; Commodore, 32K.
Approx. Price: $39.95

The best way to introduce an adventure game of **Zork**'s caliber is to let it introduce itself:

(The game begins; player commands are in capital letters.)

West of House
You are standing in an open field west of a white house, with a boarded front door.
There is a small mailbox here.

GO NORTH

North of House
You are facing the north side of a white house.

GO EAST

Behind House
You are behind the white house. In one corner of the house there is a small window which is slightly ajar.

OPEN WINDOW
AND GO IN

Kitchen
You are in the kitchen of a white house. A passage leads to the west.

GO WEST

Living Room
You are in the living room. There is a door to the east, a trophy case, and a large oriental rug in the center of the room. Above the trophy case hangs an elfish sword of great antiquity. A battery powered brass lantern is on the trophy case.

GET LANTERN AND
SWORD
MOVE RUG

With the rug moved, the dusty cover of a closed trap door appears.

LIGHT LAMP, OPEN TRAP
DOOR, GO DOWN

The lamp is now on. The door reluctantly opens to reveal a rickety staircase descending into darkness.
As you descend, the trap door crashes shut, and you hear someone barring it.
You are in a dark and damp cellar with a narrow passageway leading north, and a crawlway to the south.
Your sword is glowing with a faint blue glow.

GO NORTH

Troll Room
This is a small room with passages to the east and south and a forbidding hole leading west. Bloodstains and deep scratches (perhaps made by an axe) mar the walls. A nasty looking troll, brandishing a bloody axe, blocks all passages out of the room.
Your sword has begun to glow very brightly.
The troll swings, and his mighty blow drops you to your knees.

KILL TROLL WITH SWORD

You are still recovering from that last blow, so your attack is ineffective.
The axe knocks your sword out of your hand. It falls to the floor . . .

And that's just the beginning! From here, you must travel through countless rooms to seemingly distant places; but if you want to find out how the story ends, you'll have to play **Zork.**

ZORK STRATEGY

Zork is a very difficult game, loaded with death traps. Be prepared to lose many times before you find the winning combinations. Your objective is to find the Cyclops. **Zork** is not designed to be impossible, as some adventures seem to be, but it is very subtle. Look for this subtlety; do not try a brute-force approach.

Your first rule to play **Zork** successfully is to make a map. Consider it a necessity. Draw a box on the map to mark your starting position, and label it with the room's name. Next, move somewhere (GO NORTH), and see where you end up. If it's a new room, draw a new box, label it, and draw an arrow from room one to room two. Label the arrow "North." Label every place you visit and every treasure you find on the map. Don't assume that if you go south and then back north you will always end up where you started.

You will find several "mazes" during your travels. These will definitely get you lost, because the rooms all look the same. There is only one way to map mazes: you must have several items (tools, treasures, objects of any

kind) in your possession. When you get to the first room, drop an item. Move on, and if you come to a new room, drop another item. Soon, if you find yourself in a room where you have been before, you will see the object you have dropped; thus, you have "marked" an otherwise indistinguishable room. When moving, remember the "odd angle" directions (NE, SE, NW, SW), or you will never reach your goal and find the Cyclops.

Remember that time has meaning in **Zork.** If you are wounded in your battles with various underworld characters, it will take time for you to heal; similarly, lanterns and candles will only burn for a certain number of turns. Keep this in mind. You will probably use up many lanterns, in many games, before you can solve all the puzzles and make a "dash" through the maze to finally win.

Be fearless. Try anything. If you find a button, push it! You may die, but you may also learn something that will come in handy later. And since you are going to be killed a number of times, you should learn to "save" the game often. **Zork** is well equipped to help you with this feature. You can save the game at various points along your way, and then, if you die, restore the game to the last "saved" spot. Because there are many random factors in **Zork,** this is a good idea; you may be killed by the troll one time and not the next.

There are some places where you will get stuck. Count on it. A door may not open, or a dragon may block the passage. Explore. Look at everything around you. Consider odd uses for objects: a flask of contaminated water could poison a foe, obviously, but a properly shaped flask, filled with clear liquid, could make a good magnifying lens. After you have examined all of the objects you find, start working on the puzzles. Generally, the key to one part of the adventure will be found somewhere else.

Keep in mind that **Zork** is a "serial" game; the puzzles must be solved one at a time. It could be, for instance, that you cannot solve puzzle A until you solve puzzle B because after you have solved puzzle B, you will have access to the clues or tools needed to solve puzzle A. For example, you may find a rubber raft which you need to inflate but be unable to inflate it. So you explore some more, solve another puzzle, and find an air pump. With the pump, you can then inflate the raft and proceed to explore the river.

Zork contains some puzzles that many players consider overly difficult. If you are stuck on one of these puzzles you cannot continue the game, and that is quite frustrating. Some frustration is fine, but not to the point at which you throw away the game, so here are a few hints to help you through some of the really tough spots. They are deliberately vague so that they will be pretty meaningless unless you reach the point where you need them. After all, you may solve the puzzles on your own.

1. In what movie did Jimmy Stewart star, around 1960, with a title consisting of three semi-mystical objects?

2. Last time I tried them, hot peppers made me thirsty; and what you have in your canteen might be just the thing for one of the local residents. Don't be too smug when you figure this out; there is another way.

3. If you are at a canyon that throws an echo, what do you inevitably say?

4. If you were an Egyptian ruler with a sceptre, would you just hold it, or perhaps wave it around?

5. Ever read about the travels of Ulysses? Even the name might be scary to those inside the cave.

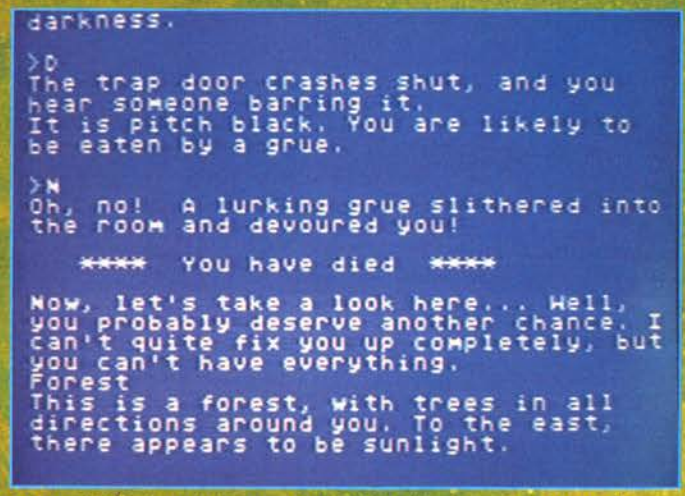
6. Learn to operate the dam, and watch the results of doing so.

7. You cannot do everything. Only other denizens of the cave are sufficiently dexterous to manipulate certain treasures.

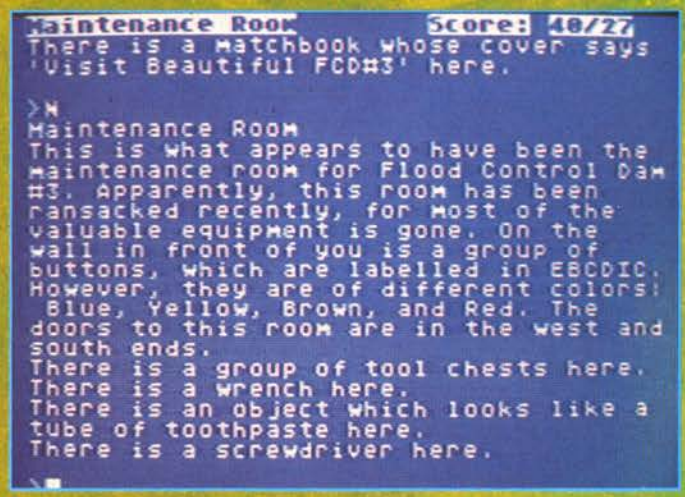
8. The mine lift does not. No matter how hard you try.

9. What substance, traditionally valued by women, is made of carbon?

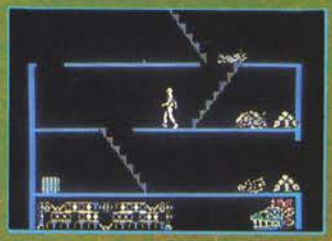
10. Open everything that can be opened. And remember to put out your lantern if you are in the presence of something that gives off light—or you'll run down the batteries!



Oh no! Killed again! Sometimes it is wise to save a game in progress so that you aren't "killed" permanently. This way at least you won't have to go all the way back to the beginning of the game.



Try to think of unusual uses for the objects you find in the rooms of the house. (A tube of toothpaste?!!)



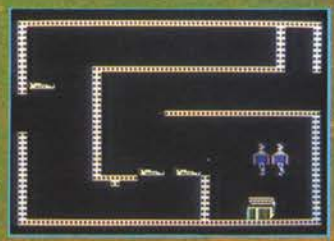
AZTEC

From: Datamost
For: Apple IIe/Plus, Atari 400/800, Commodore 64, IBM PC.
Format: Disk (Apple, IBM), cartridge (Atari, Commodore).
Requirements: Disk drive (Apple, IBM); standard memory for each machine.
Approx. Price: $39.95

Computer gamers often complain that adventure games lack imaginative graphics. **Aztec** solves this problem. The graphics in **Aztec** are stunning. They go far beyond the usual 3-D maze view or floor plan diagrams. You actually see your character (and your enemies) on the screen—and in great detail!

Lions trot toward you, swinging their tails from side to side, snakes slither across the screen, and the treasure chest hatches open and close. All of these graphics are presented in brilliant colors.

You are the adventurer, dressed in a British colonial uniform. Your objective is to obtain as many treasures as possible without being eaten by the dozens of unpleasant creatures that inhabit the multi-level dungeon. In order to successfully master this game, you will need to develop complex strategies and be willing to put up with a certain amount of trial and error.



CASTLE WOLFENSTEIN

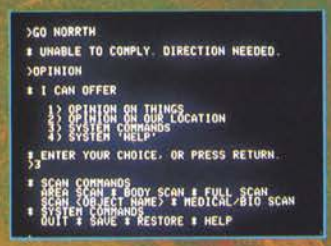
From: Muse Software
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $29.95

Castle Wolfenstein—another adventure game that does not abide by the classic adventure format—features full-color graphics and animation rather than the typical text descriptions.

You enter the game as an American trapped in the infamous Castle Wolfenstein during World War II. Your goal is to explore the castle and escape without being trapped by your Nazi captors.

This is hardly a simple task. It requires a combination of arcade speed (to survive in the individual rooms) and adventure strategy (to escape the castle). To obtain keys to doors you must search the clothes of the Nazi guards—but you have to kill them first.

Castle Wolfenstein will challenge you for quite some time, as you learn the layout of the castle (which changes, by the way) and the strategy elements needed to escape with your life. We recommend it for anyone who would like to try a very different and challenging kind of adventure.



CYBORG

From: Sentient Software
For: Apple IIe/Plus, Atari 800/1200, Commodore 64, IBM PC.
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $34.95

Cyborg is an adventure game with a rather unusual theme. You have landed on a strange new planet, and there is something distinctly odd about you: you are half human, half machine—a Cyborg.

Your "mind" has a definite split personality, so the first order of business in this game is to get to know yourself and learn how to move around. In landing on this planet you have lost that knowledge, and you now need it in order to survive.

Playing **Cyborg** can be frustrating because responses to your commands will be slow. However, the idea is quite imaginative, and the puzzles are very intriguing. **Cyborg** was written by science fiction author Michael Berlyn; it represents one of the first attempts to combine true science fiction with an adventure.

So, if you have a lust for science fiction, and would like to try being half human, half robot, then give **Cyborg** a try. It will offer you hours of challenging fun.

HIGH-RES ADVENTURES 1-6

From: On-Line Systems
For: Apple IIe/Plus (all six), Atari 800 (Mission Asteroid, Lizard and the Princess, Ulysses), IBM PC (Ulysses).
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: Mission Asteroid (Apple, $19.95); Atari, $24.95); Mystery House (Apple, $24.95); Lizard and the Princess (Apple, $34.95; Atari, $32.95); Cranston Manor (Apple, $32.95); Ulysses (Apple, $34.95; Atari, $39.95; IBM, $39.95); Time Zone (Apple, $99.95); Dark Crystal (Apple, $39.95).

The **High-Res** (high-resolution graphics) **Adventures** from On-Line Systems actually include six different adventure games of varying difficulty. Instead of the usual text descriptions, each game features full-color graphics of every situation you encounter. The most popular of these high-quality games is **The Wizard and the Princess.**

The object of this game is to rescue a beautiful princess from the clutches of an evil wizard. In your search you will encounter everything from gnomes to giants. And the riddles that must be solved can be very time consuming, so don't plan on beating this game in one afternoon.

HUNT THE WUMPUS

From: Texas Instruments
For: TI 99 4/A
Format: Cartridge
Requirements: Standard memory.
Approx. Price: $24.95

Hunt The Wumpus is based on the popular computer scenario of stalking your prey through a maze of hidden tunnels. What makes the TI version entertaining are the multiple options of play that you can choose. As the hunter, you are equipped with a single arrow, so you don't have any second chances. You can select mazes that vary from easy (laid out in grid-like fashion) to expert (a complex collection of winding passageways). Your path appears as you travel through the Wumpus' lair. When you think you've found the Wumpus, you fire your arrow in the direction that you suspect he is hiding. If you're successful, you've got the Wumpus! If not, score one for the Wumpus.

Your clues to help you find the Wumpus consist of bloodstains that the Wumpus leaves within his hiding area, and you can select a "blindfold" option that covers your tracks, leaving your entire chance of success to memory. You also encounter slime pits, scattered throughout the caverns, and bats, which will randomly lift you from one cavern and deposit you in another.

SCOTT ADAMS ADVENTURES

From: Adventure International
For: Apple IIe/Plus, Atari 400/800, Radio Shack TRS-80 Color Computer, Texas Instruments 99 4/A.
Format: Disk (Apple, Atari); tape (Apple, Atari, Radio Shack); cartridge (Texas Instruments).
Requirements: Disk/tape drive; Apple, 48K and DOS 3.3 (disk); Atari, 24K (tape), 32K (disk); Radio Shack, 16K (tape); Texas Instruments, standard memory (cartridge).
Approx. Price: Apple, $39.95 (disk); Atari, $24.95 (tape), $29.95 (disk); Radio Shack, $24.95 (tape); Texas Instruments, $29.95 (cartridge).

Scott Adams is an amazing fellow with quite an imagination, and it really shows in these classic adventure games, where little details and puzzles abound.

The **Scott Adams Adventures** are a great deal of fun to play because they have wild settings (outer space, a swamp, your living room, a pirate island) and because they are not excessively difficult. The satisfaction of adventure games is solving the puzzles, and Scott Adams has been merciful in this respect—giving you clues and even allowing you to ask for hints (HELP). The games may also be saved.

We highly recommend these games to beginning adventurers. Because they have built-in help, they can save hours of frustration.

STARCROSS

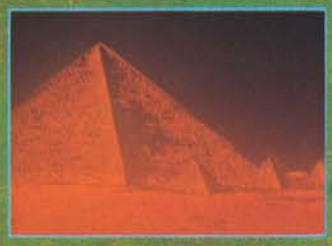
From: Infocom Inc.
For: Apple IIe/Plus, Atari 400/800, Commodore 64, IBM PC.
Format: Disk
Requirements: Disk drive; Apple, 32K; Atari, 32K; Commodore, 32K; IBM PC, 48K.
Approx. Price: $39.95

Congratulations! You have just awakened from a "deep sleep" aboard a spaceship. Your mass detector has pinpointed a black hole in your vicinity, and you find an alien spaceship to explore.

Welcome to **Starcross**, the latest adventure game from the makers of **Zork**. Everything about this game demonstrates complete good taste. **Starcross** comes packaged in a molded spaceship—complete with interstellar maps and a stack of reading material to help you on your journey. The program understands complete sentences, which places it well ahead of the many adventures that only understand two-word commands.

Soon you will be exploring the alien ship and the numerous puzzles it contains. But be prepared: they are completely different from anything you've previously experienced.

This is not a standard adventure. It sets a standard for adventures to follow, by creating a very consistent and believable reality, and letting you explore it.



SANDS OF EGYPT

From: Radio Shack
For: Radio Shack TRS-80 Color Computer
Format: Disk
Requirements: Disk drive; 16K; Extended BASIC.
Approx. Price: $29.95

You are in Egypt. You know this because the screen shows a camel on a desert. **Sands of Egypt** is a quest adventure with pictures.

Adventure games began as text-only programs, but the new generation includes graphic displays which set scenes, offer clues, and appear as logical consequences of where you travel within the game. A computer game adventure is fiction in which you are the main character and your decisions determine whether you win or lose the game—a life or death outcome in serious adventures.

In this game, you assume the role of Sir Percy. You are in search of the Tomb Ra in the Sahara Desert. You are alone, with only a compass, and you need water. Things are not always as they seem, and there are many surprises in the game (which can take quite a few hours to solve).

The graphics—at times animated—greatly enhance the adventure, and this game sets high standards for others to follow.

GAME TYPE II:

EDUCATIONAL GAMES

As many students will testify, playing a video game is a lot more fun than memorizing multiplication tables or doing almost any other sort of homework. Video games offer a one-on-one challenge and plenty of colorful action.

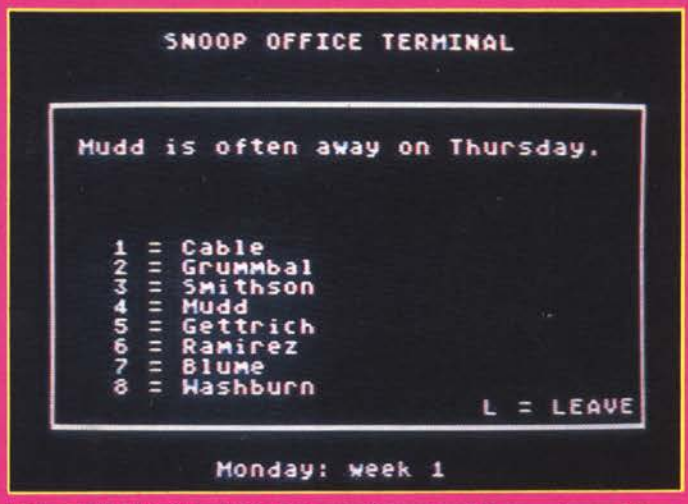
Naturally, parents are less than overjoyed to see yet another distraction to keep their children from studying, but there are educational benefits from home computer gaming that can complement a child's schoolwork.

Almost any computer game can be considered educational in some sense. Some games promote development of logic skills and pattern recognition. **Pac-Man,** for instance, requires that the player watch four different objects in a maze and then determine a course of action based on their movements—a bit like high speed checkers against four players. Games that are specifically designed to educate are written with considerably more "learning" in mind, and they are usually directed toward formal educational goals.

Aa Bb Cc Dd Ee Ff

$$\begin{array}{r} 2 \\ +2 \\ \hline 4 \end{array} \qquad \begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array} \qquad \begin{array}{r} 2 \\ +4 \\ \hline 6 \end{array} \qquad \begin{array}{r} 2 \\ +5 \\ \hline 7 \end{array}$$

Snooper Troops features colorful photos and readily understandable language for young children. It allows them to "interact" with the computer by "asking" questions. In the screen above the computer talks back.



Some of the hints include information about time—days of the week or times of day; such clues demand logical thinking.

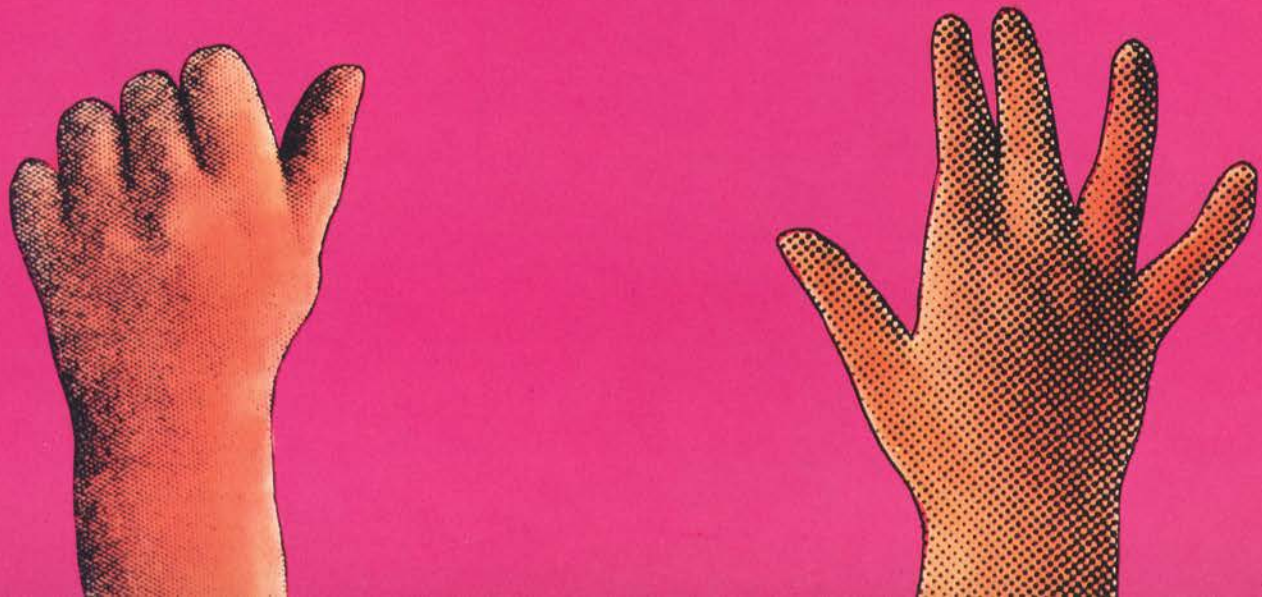
It's a difficult proposition to make a game both educational and fun. One type of computer-aided education features basic shoot-'em-ups and other fun games that have minimal educational value; the second type drills students in a way that is probably just as monotonous and primitive as flash cards. A lot of educational software simply fails to strike a suitable balance between fun and learning, but parents will be glad to know that some good, educational computer games do exist.

Computer education in various forms has been around for some time. The idea is certainly a good one, since computers can teach on a one-to-one basis, have infinite patience, and are fun for the child.

Cost has traditionally been the obstacle to instituting computerized instruction. Large-scale educational computer systems, like PLATO, can cost thousands of dollars per month to use. The machines are very large and connect to remote terminals via phone lines. Very few school systems can afford them, and today they are found mostly in large businesses, where their high-powered teaching capabilities are cost-effective.

With the advent of the microcomputer, the computer education community, somewhat discouraged by the high cost of computing, was given a fresh start. Educational institutions found that they could buy two or three home computers for the price of one month on a large computer system. Top educators began to write microcomputer software to help teach children. As a result of these developments school systems across the country are now beginning to incorporate microcomputers into the classroom environment.

Many of the following games are used at the Ceden Educational Center in Austin, Texas, where they use computers daily to help teach children. Therefore, the games in this section have actually been tested in an educational environment with favorable results; they all hold a child's attention, yet provide high educational value.



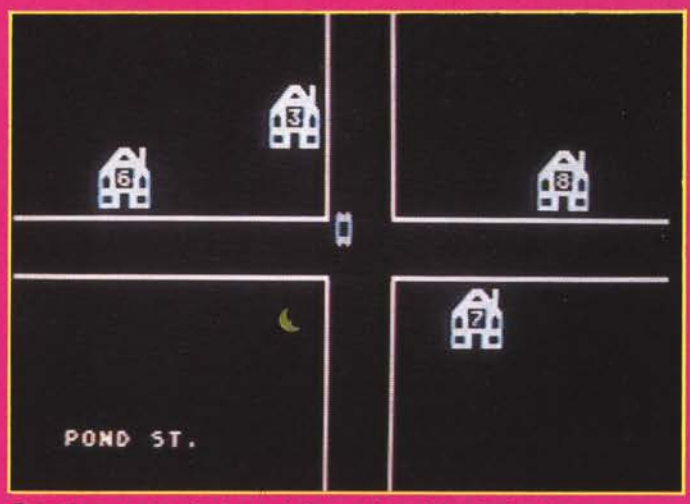
SNOOPER TROOPS #1

From: Spinnaker Software
For: Apple IIe/Plus, Atari 400/800, Commodore VIC 20 and 64, IBM PC.
Format: Disk (Apple, Atari, Commodore, IBM); cartridge (Commodore).
Requirements: Disk drive; Apple, 48K; Atari, 48K; Commodore, NA; IBM, 64K, color card.
Approx. Price: Disk, $44.95; cartridge, $39.95.

Snooper Troops, with a detective theme much like **Deadline,** might well be considered an adventure game for children. **Snooper Troops,** while not an easy game, is clearly written for a younger audience. Children can solve the Snooper puzzles and have a good time doing so. **Snooper Troops** is loaded with subtle learning situations like mapmaking and logical thinking about time (for example, what happened before or after a certain time).

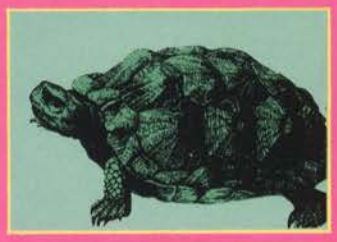
Putting all the pieces of the puzzles together takes quite some time, perhaps several sessions. However, winning this game is not the designer's goal; achieving the individual steps required to win the game is. For example, the student must drive around town and create a map of vertical and horizontal streets. Each house on these streets has a number, 1 through 9, just like lines on graph paper. By the time the map is completed, the child will be able to identify any house on the map by its X and Y coordinates. By using a very subtle and practical example the student learns how to plot Cartesian coordinates, a basic geometric skill.

Snooper Troops is loaded with these "disguised" educational exercises. There are even some additional aids provided, such as the Snoop Camera (flash! you take a picture of some evidence) or the Snoop Wrist Radio, which periodically tells you of clues found back at the station—just like Dick Tracy. The writer of this program went to a lot of effort to make sure that the child would not say, "This is just like school. Bleah!" That effort makes **Snooper Troops #1: The Case of the Granite Point Ghost,** our pick for best educational game.



Creating a map of a town is fun and teaches the basic geometry of working with a grid (Cartesian X and Y coordinates).

Messages for the Snoop Wrist Radio sometimes appear on the screen. They add excitement to the game.



COLOR LOGO

From: Radio Shack
For: Radio Shack TRS-80 Color Computer
Format: Disk, cartridge.
Requirements: Disk drive; 32K (disk); 16K (cartridge).
Approx. Price: Disk, $99.95; cartridge, $49.95.

One of the more popular innovations in terms of computer languages is a computer language for kids called LOGO. There are many LOGO languages available for different machines; they feature simple instructions, easy-to-remember program keywords, and "turtle graphics." Turtle graphics refers to a fantasy screen "turtle" that the young programmer moves across the screen in order to draw tracks and lines. The LOGO concept is a great success, and there are hundreds of thousands of students learning one of its various forms.

Color LOGO, the Radio Shack version of the popular language, includes activities for youngsters who have not yet even learned to read. It also leaves room for sophisticated activities.

Color LOGO is a good way to start a child on the path toward programming. In just a few minutes children can be drawing multicolored lines, creating spirals, and producing many interesting effects. LOGO is quite popular in the educational community and even has user groups which meet to discuss its applications.

DLM ARCADEMICS SERIES

From: Texas Instruments and Developmental Learning Materials.
For: TI 99 4/A
Format: Cartridge
Requirements: Standard memory.
Approx. Price: $39.95

Arcademics (arcade/academics) is actually six cartridges designed to teach basic arithmetic in an exciting arcade-game-style approach. **Alien Addition, Minus Mission,** and **Alligator Mix** drill the student in addition and subtraction skills; **Meteor Multiplication, Demolition Division,** and **Dragon Mix** demand multiplication and division skills.

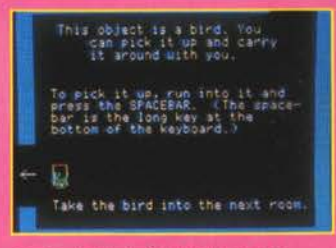
Rather than pushing a fire button on a joystick to fire at an invading alien or a falling meteor, the player must type the correct answer to an arithmetic problem. The better the player's arithmetic, the faster and more exciting the games become.

ERNIE'S QUIZ

From: Apple Computer, Inc.
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; paddles; 64K; language card.
Approx. Price: $50.00

Ernie's Quiz is based on the popular character from the Children's Television Workshop show "Sesame Street." In fact, the CTW people designed this program for Apple. This very entertaining quiz asks the player to identify "Sesame Street" characters, by gradually filling in a picture of the character on the screen, a few dots at a time. Eventually, the picture will be complete, but the idea is to guess the character's name before that happens. The earlier the child guesses, the more points are awarded.

There are several other games in this package, all based on the same characters. The games follow the educational style presented on the "Sesame Street" television program very closely; if your children watch the show regularly, they will probably enjoy the games—if not, then they may find them difficult to understand. Apple recommends this game for children aged from four to seven.



GERTRUDE'S PUZZLES

From: The Learning Company
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $44.95

The Learning Company is a California-based firm with a reputation for very high-quality games. **Gertrude's Puzzles** is a mini-adventure game, played in a room with a bird's-eye view. Gertrude is a goose who makes puzzles for the child to solve.

The child's goal is to release Gertrude by putting together several patterns. The player wanders through rooms, finding and picking up different objects (such as keys), mapping the area, and assembling the collection. After sufficient study, the child will be able to deal with Gertrude.

This game requires some skill on the child's part. Maps must be drawn and routes planned, but it moves at a slower pace and is generally easier than **Snooper Troops.**

The game features "on-line instructions" to lead the child through the game step by step. This is a great way for a young student to overcome the initial fear of using a computer.

HODGE PODGE

From: Dynacomp, Inc.
For: Apple IIe/Plus, Atari 400/800.
Format: Disk (Apple, Atari); tape (Atari).
Requirements: Disk/tape drive; 48K (disk); 24K (tape).
Approx. Price: Disk, $18.95; tape, $14.95.

Dynacomp tackled the problem of introducing a very young child to computers some time ago, and they produced **Hodge Podge** as a result. The idea behind this game is to associate the video image on the TV with the child's simplest actions; the activated part of the keyboard produces its own image on the television, so that the child can associate specific keys with specific reactions.

Even one-year-olds can have a good time with this game, hammering on the keyboard and watching the pretty pictures appear. **Hodge Podge** is actually just a set of pictures and sounds associated with each key on the computer's keyboard. For example, if you press "H," you will see a picture of a horse and hear the music to "Camptown Races"; "D" will give you an animated dog and different music; and "W" will show you a worm moving across the screen to yet another tune.

This is a wonderful program for very young children. It responds instantly to key presses and entertains children for hours at a time.

INSTANT ZOO

From: Apple Computer, Inc.
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; paddles, 64K; language card.
Approx. Price: $50.00

Instant Zoo, like many other educational programs, is a combination of several different games. The main game is very much like **Ernie's Quiz.** Animal shapes gradually appear on the screen and the object is to name the animal as soon as possible. This type of game helps children visualize and recognize a variety of different animals. (**Instant Zoo** is not related to the "Sesame Street" television program.)

Scramble is another game included on this disk. The player is presented with scrambled words and is expected to unscramble them as quickly as possible. Then there is **Quick Match,** which requires the player to rapidly match the words that appear on the screen. There's even a Word Editor, which allows you to add words to either of the above two games.

Apple suggests these games be used by children aged seven to ten. The programs can also be used competitively—which is often a successful means of promoting learning.

MIX AND MATCH

From: Apple Computer, Inc.
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $50.00

Mix and Match is another educational game in the series featuring "Sesame Street" characters. The screen displays several of the characters broken up into body parts (legs, head, arms, etc.). The operator can reassemble these characters in any way he or she chooses. A newly formed character may have Oscar the Grouch's head, Ernie's middle, and Big Bird's legs.

The graphics in this game are very well done, and the outcome is usually pretty comical. Children enjoy the opportunity to design characters of their very own, and here they see what a computer can do to project their creative imagination.

Another example of the games included on this disk is the classic **Animal.** In this game, the player is asked to imagine an animal. The computer then questions the player, until it can either guess the animal or becomes "stumped." If the computer loses, then the player can enter the animal's name and description into the computer's vocabulary.

TIC TAC SHOW

From: Computer Advanced Ideas
For: Apple IIe/Plus, IBM PC.
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $39.95

Tic Tac Show is a game very much like the television game show "Hollywood Squares." In this game the players are playing tic-tac-toe with questions. To win a square, the player must answer a question hidden "behind the square's door."

The questions are not included, but are programmed for the child by an adult. The key to success with this program is to choose questions on a topic related to the child's education or interests.

The graphics include a cute tic-tac-toe picture and a colorful emcee. It is probably the closest that any of us will come to playing "Hollywood Squares." **Tic Tac Show** is recommended for children old enough to read and type answers on the keyboard.

GAME TYPE III:

MAZE GAMES

When people think about electronic maze games, most often they think of **Pac-Man.** The objective of that popular arcade game is to move the little Pac-Man around a computerized maze—the on-screen playfield. As you maneuver Pac-Man around the screen, eating dots and avoiding monsters, you are restricted by the configuration of the maze. The limitation plays a vital role in your game strategy, forcing you to plan ahead, to see your next move before you make it. These tactics require a different kind of skill from the blast-away techniques of a good space game.

There are many computer games that look nothing like **Pac-Man**, but which nevertheless follow the same guidelines that constitute a maze game. The maze game genre is defined more accurately by the strategy involved than by the graphics that appear on the screen. In **Frogger,** for example, your goal is to maneuver a frog across a busy highway and a rushing stream—both filled with moving obstacles—to reach the safety of a lily pad. Although there is no "maze" visible on the screen, the moving objects in the frog's path dictate when and where you will move. They force you to plan ahead for each jump (or series of jumps) so that you can successfully navigate your frog through this moving "maze."

Borg also looks very different from **Pac-Man** but qualifies as a maze game; in fact, it is very similar to the arcade game **Berzerk.** In **Borg** you must shoot at alligators while traveling through several rooms. The maze of walls limits the area in which you can travel, compelling you to make an attack plan quickly for each room. This form of game play (and the basic playing skills it requires) is very similar to **Pac-Man.**

Another trait that maze games have in common is non-violence. You'll seldom find a maze game that centers around invading aliens or doomed planets. They generally feature clever animation and rely on strategic game play more than aggressive player reactions. Because of this, maze games have maintained a devoted following of players.

THE BEST MAZE GAME:

PAC-MAN

From: Atari, Inc.
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $44.95

Pac-Man is the "ultimate" maze game. The Atari home computer version of **Pac-Man** is a perfect clone of the coin-op game, with the same bright colors, cheery sound, and excellent play characteristics as the original. If you have an Apple computer, **Tax-Man** (H.A.L. Labs) is the next-best alternative, although **Pluckman** (Datamost) and **Snack Attack** (Datamost) are also quite good.

The game takes place in a colorful maze haunted by four Pac-Man-eating ghosts. You are Pac-Man. You must travel through the entire maze, eating all the dots (and avoiding ghosts). Your only weapons are four "power pellets" which, when eaten, enable you to munch the ghosts for extra points. This is a very "cute" game, offering something more than just shoot-'em-up action: colorful characters, lively music, and no violence.

Pac-Man is not difficult to play, but it is very difficult to master. Playing it successfully involves a great deal of strategy. The maze layout limits your maneuverability, which makes avoiding the ghosts a real challenge, and your weapons (the four power pellets) are effective only temporarily, thereby increasing the challenge.

PLAYING THE GAME

Pac-Man requires a completely different set of game-playing skills from those required by a game like **Defender** (which places a premium on reflexes and aggression). You do not need "fast hands" to play **Pac-Man.**

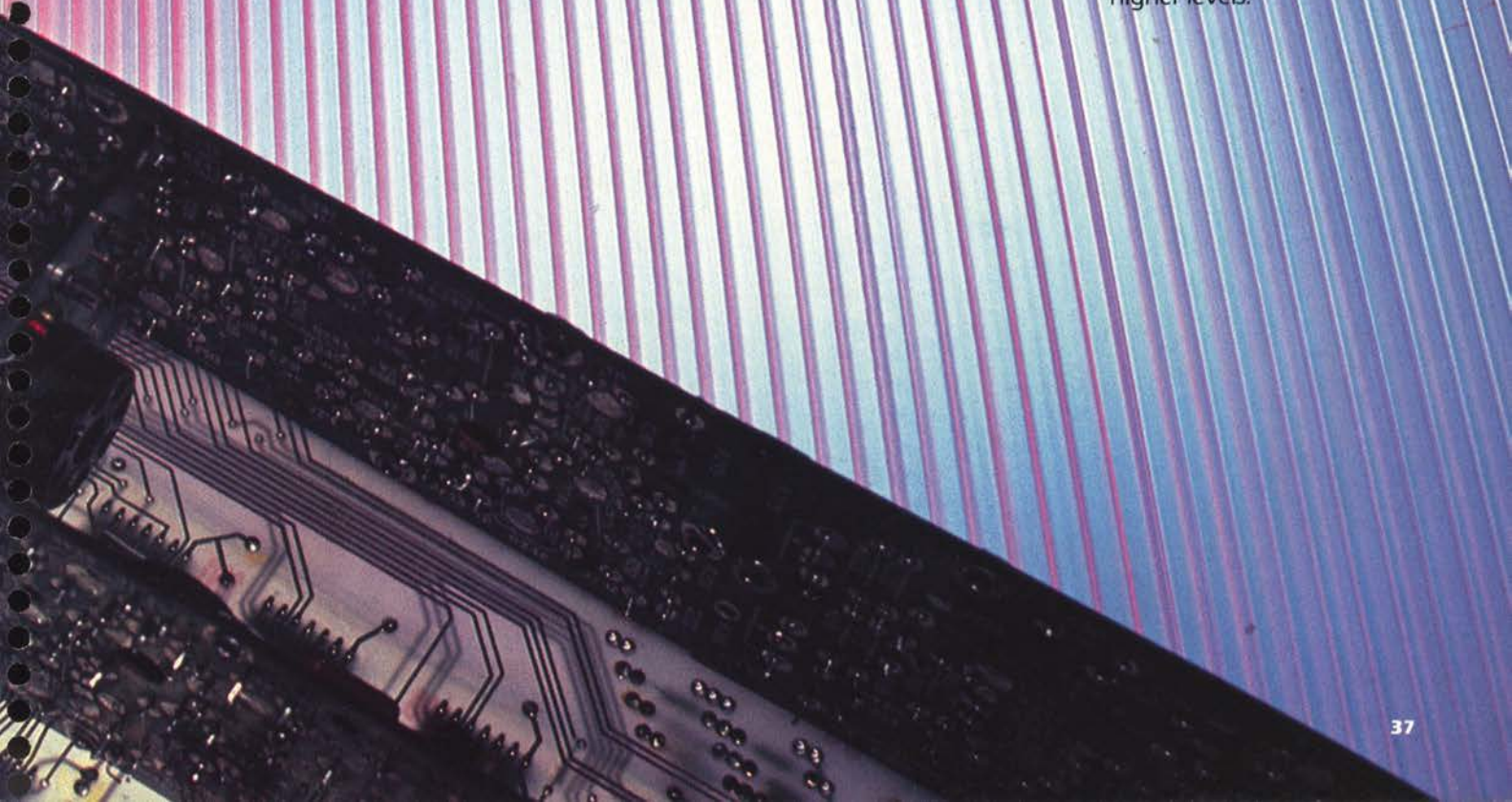
Your main objective in playing **Pac-Man** is to collect as many points as possible by (1) eating all of the dots in each screen, (2) eating ghosts (with the aid of power pellets), and (3) collecting prizes. Optimally, you must accomplish this without being eaten by the ghosts.

Pac-Man is played with a joystick only. The joystick moves you in the direction you point to—provided there are no walls in the way. You can move in one of four directions; pushing the joystick in a diagonal direction fouls up the program and produces unexpected turns.

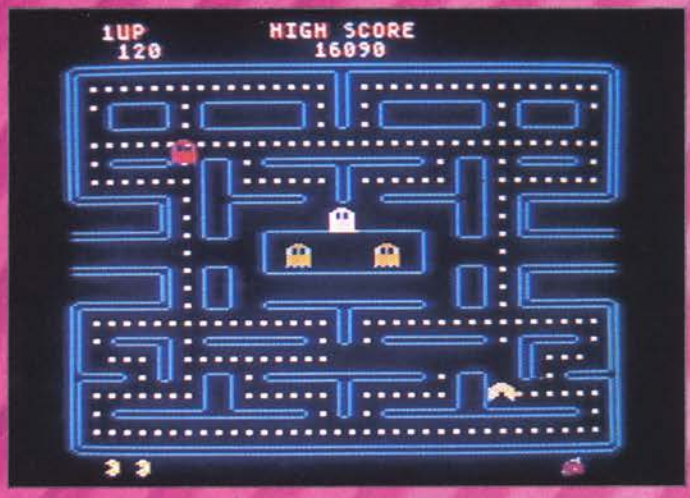
As Pac-Man, you move through the maze, eating dots as you go. Each maze contains four ghosts. They are programmed to chase you around the maze and kill you on contact. They are only vulnerable when they turn blue; this occurs each time you eat a power pellet. Power pellets are large dots which appear in each corner of the maze. Munching them causes the ghosts not only to turn blue but also to scurry away.

As the game progresses, prizes (in the form of fruit and other objects) appear at the bottom of the screen, outside of the maze. These prizes also appear simultaneously within the maze and can be eaten for bonus points. In the lower levels of the game they aren't worth much, but as you reach the advanced screens, they become considerably more valuable.

The game speeds up each time you clear a screen. You also have the option of beginning the game at higher levels.



Watch the ghosts carefully, especially in the beginning. Focus your eyes on the central area and use your peripheral vision to manipulate Pac-Man through the maze. If the ghosts hesitate before coming out of the box . . .



. . . make your move to clear out the treacherous Bottom Alley first, before they have a chance to capture you. The earlier you clear this area, the better.

STRATEGY

Your first rule is to stop looking at Pac-Man. Focus your eyes on the central boxed area, and let your peripheral vision do the work. Your peripheral vision is much more sensitive to movement than your central vision; let it work for you. Soon, you will be following the general "flow" of the game—namely, where the ghosts are and what they are up to. When you get into a tight spot or try to eat a power pellet just before a ghost arrives, you should refocus your vision on Pac-Man. But otherwise, try to pick up the whole game board with your vision. You will find that your brain makes an excellent "look-ahead" computer if you let it.

Look for general patterns in the ghosts' behavior. Although the coin-op **Pac-Man** can be beaten by using specific patterns, the Atari ghosts move in a random manner that no pattern can handle completely. The ghosts do, however, have personalities. Listen to the background siren. It tells you whether you are in the "safety" or "danger" mode. When the siren sounds at its lowest level, you are in the safety mode (which means that the ghosts will follow fairly regular patterns and will go to great lengths to ignore you). Only extreme provocation will cause an attack. But when the background music changes (and the siren sound speeds up), the game shifts into the danger mode. At that point, the ghosts will try to converge on you.

To play **Pac-Man** well, you must always look ahead for trouble. For instance, the dots along the Bottom Alley are very troublesome, and the decision to clean them out will depend on whether the ghosts are near enough to catch you before you're through. You must develop the right timing, a sense of judgment about the ghost's speed and maneuverability, and a grasp of Pac-Man's performance on the straightaways. There is no substitute for practice.

In spite of **Pac-Man**'s random game play, there are two entrance patterns that can help you get your game off to a good start. Beyond this point, you'll have to "wing it."

In both of these beginning patterns you must start the game with the joystick pre-positioned to the right. Pac-Man will begin munching in that direction.

PATTERN A

If the ghosts hesitate before exiting their box when the game begins, you should immediately head for the bottom of the screen and eat all the dots in Bottom Alley. If you work quickly, you should have just enough time to accomplish this before the last two ghosts exit the box and head toward you.

The Bottom Alley is the most dangerous part of this game. It is very long, and you can easily become trapped. This makes it a favorite place for the ghosts to split up and attempt to surround you. If you can clear all of the dots out of this section at the start of the game, you will be much better off. And two ghosts will undoubtedly be following you, so grab the power pellet in the lower left corner and gobble them up.

PATTERN B

If all four ghosts fly out of the box immediately at the beginning of the game, head to the top of the screen and clean out the dots in the upper areas. At this point, the game will be in the safety mode and it will be easy to avoid the ghosts. If you work quickly, you'll be able to clear the top areas of the screen before the game switches to the danger mode. Then you can eat one of the top power pellets, head downward (catching as many blue ghosts as you can), and work on the remaining dots. This will be the trickiest part of the game. Use the remaining power pellets to help clear the bottom area, particularly Bottom Alley. Then work your way to the top power pellet on the other side, eat it, and head down to finish the maze.

The prizes are somewhat dangerous to approach and relatively worthless at the beginning of the game. The computer program tells the ghosts that the treasure is Pac-Man's location—just to make sure they head that way. Ignore the prizes for at least the first five screens, until they are worth the risk (more than 1000 points). Until then, concentrate on catching ghosts and clearing screens.

Be especially wary of going into corners during the danger mode. The ghosts try to split up and trap you between them. If this happens, you're dead.

Remember that you move more slowly when you are eating dots. If you are being closely pursued, turn as many corners as possible, and try to stick to cleared corridors until you can outrun the ghosts or reach a power pellet; otherwise, you will be run down. This is particularly critical on the third screen, where the monsters are fast but you are still slow. (You gain speed on the fourth screen and things even out.)

If you need a good place to hide, the safest place is in the center of the screen around the ghosts' box. The ghosts try to avoid this area, and they only go around it in the direction that they started—they won't double back.

As you approach the end of the game, remember that when there are ten (or fewer) dots on the screen, the ghosts shift into high gear and really come after you. Your only priority now should be to finish the screen. Don't mess around with the ghosts; even if you swallow a power pellet and manage to eat all four of them, they will be back out of the box immediately. They are most dangerous at this point.

If you learn the two beginning patterns and the tips presented here, you'll have a good start on playing the home computer version of **Pac-Man** successfully, but that doesn't mean it will be an easy task. As stated before, there's no substitute for practice.

If the ghosts pop right out of the box, head toward the top of the screen and clear as much as you can. Always try to leave a corridor clean, so that you don't have to go back.

The prizes are dangerous to approach and are almost worthless at the start of the game. Ignore the prizes until they are worth the risk (more than 1000 points).

If you need a good place to hide go for the center area. The player in the screen above is about to find out the hard way about being trapped in the corners.

APPLE PANIC

From: Broderbund Software, Inc.
For: Apple IIe/Plus, Atari 400/800, IBM PC.
Format: Disk (Apple, Atari, IBM); tape (Atari).
Requirements: Disk/tape drive; Apple, 48K; Atari, 24K (disk), 16K (tape); IBM, 64K, graphic adaptor card.
Approx. Price: Disk, $29.95; tape, $29.95.

Tired of games that require lightning-fast reflexes and blinding speed on the firing button? Tired of loud, obnoxious explosions? Then you will probably find **Apple Panic** a welcome relief.

This game's format is much like **Donkey Kong**, except that the "ramps" are all horizontal, with ladders connecting each level. There are five or more apples moving back and forth along these levels, and the object of the game is to destroy all the apples. To accomplish this, you must first smash holes in the different levels with your shovel (the action button on your controller). Any apple that moves over a hole will fall into it and become stuck. You must then return and hit the apple several times to shove it through the hole.

Apple Panic progresses at a relatively slow pace; each screen takes several minutes to complete. But make no mistake: there is a great deal of strategy packed into this slow-moving game, just as there is on the first screens of **Pac-Man**.

BORG

From: Sirius Software
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $29.95

This game is very similar to the coin-op game **Berzerk**; however, it contains an interesting innovation which will be a real surprise when you first play (because we aren't going to reveal it here).

Your goal, while shooting at alligators who are shooting back at you, is to make it through a semi-3-D maze. If you are too slow getting through a particular room, a computerized voice shouts "Borg!" Suddenly, a flying kangaroo (Borg) appears and starts chasing you, just like Evil Otto from **Berzerk**. Naturally, Borg is indestructable.

Your only chance to avoid destruction is to run frantically to the next room.

Borg's semi-3-D view (slanted, like **Zaxxon**) is quite interesting, although it's frustrating at first. While traveling through the maze, your feet must not touch any obstacles. The odd perspective takes some getting used to, but it is quite manageable after a little practice.

Borg offers a further challenge to die-hard **Berzerk** gamers, but it's also well-suited for beginning computer gamers.

FROGGER

From: The Cornsoft Group
For: Radio Shack TRS-80 Color Computer
Format: Tape
Requirements: Tape drive; 16K.
Approx. Price: $19.95

In this game, the player must maneuver a frog through a maze of moving objects to reach the safety of its home pond at the top of the screen. The screen is divided into two segments: the lower half is a busy freeway, with cars and trucks trying to run over the frog, and the upper half is a rushing river where the frog must hop from boat to log to turtle without falling into the water. The two challenges are very different, but the hardest part is the water maneuvering.

The joystick is used to "hop" the frog one step in any direction. Needless to say, timing a hop onto a moving log is quite a challenge, and good timing is necessary in order to avoid a fatal mis-hop.

Despite its obvious "cuteness," **Frogger** is a very challenging game, and is recommended for players of all levels. This particular version runs very well and is superior to other similarly named games.

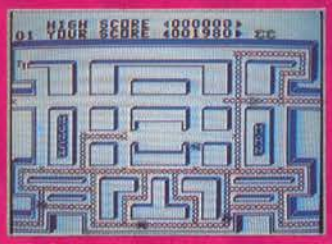
MOUSKATTACK

From: On-Line Systems
For: Apple IIe/Plus, Atari 400/800, IBM PC.
Format: Disk
Requirements: Disk drive; Apple, 48K; Atari, 40K; IBM 64K.
Approx. Price: $34.95

When On-Line's John Harris wrote **Mouskattack**, many labelled it a **Pac-Man** clone. There are similarities, but **Mouskattack** is a superior maze game that requires complex strategies and offers a two-player option.

In this game, you and a partner are in a maze with four rats. Your job as resident plumber is to "pipe" the entire maze—much like covering the entire maze area in **Pac-Man**. The rats pursue you and attempt to stop your work. For defense, you have the use of four cats. With two players on the screen at the same time, you can plan intricate strategies and work together to foil the evil rats, which is much more fun than taking turns at the game. Each player can pick up, move, and drop two cats at any location in the maze. The rats cannot run over the cats, so you can use the cats to block the rats' movements.

By strategically dropping cats, you can trap several rats throughout the maze and then complete the job at your leisure. This is a satisfying feeling indeed. **Mouskattack** is a fine game for anyone who likes maze games; and with two players, it offers twice the fun.



MUNCHMAN

From: Texas Instruments
For: TI 99 4/A
Format: Cartridge
Requirements: Standard memory.
Approx. Price: $39.95

If you are a bona fide addict of Atari's **Pac-Man,** you'll find **Munchman** to be a reasonable alternative for the TI-99/4A. The **Munchman** maze is similar in design to **Pac-Man** and you get a head start over the four monsters, who leave the center of the maze after about five seconds. You give the Munchman energy by devouring one of four tiny TI logos placed near the four corners of the maze. The attacking monsters are reasonably intelligent and have an annoying habit of chasing you when you're vulnerable (and avoiding you when your level of strength is high).

The first level of play becomes relatively easy after a few sessions, but to maintain the challenge, **Munchman** automatically increases in difficulty each time you successfully clear a maze of the monsters. **Munchman** is a good rendition of the classic maze game, and you'll find yourself becoming addicted as you pursue higher and higher scores.

PREPPIE!

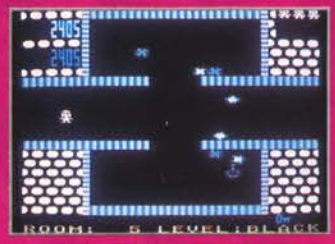
From: Adventure International
For: Atari 400/800
Format: Disk, tape.
Requirements: Disk/tape drive; 16K (tape); 32K (disk).
Approx. Price: $29.95

Preppie! looks and plays much like **Frogger**. But instead of controlling a hopping frog, the player must maneuver a typical "obnoxious preppie" (complete with golf shirt and bermuda shorts) through a maze of moving obstacles.

Your goal, as a prepster, is to collect as many golf balls as possible at the local golf course. In the bottom part of the screen, you have to avoid racing golf carts, lawnmovers, and bulldozers; as you proceed to the top, you must jump from boat to log to alligator, and cross the river. All of these maneuvers require fast reflexes, a good eye, and timing.

There is an obvious attention to detail in **Preppie!** that makes it an enjoyable game to play. If your preppie is run over by a lawnmover, he gets flattened—literally. And throughout the game he marches to a painfully cheerful rendition of "I Was Strolling Through the Park One Day."

Everything has been designed to give you the real feeling of a snooty preppie. We highly recommend **Preppie!** as one of the most humorous games ever created.



SHAMUS

From: Synapse Software
For: Atari 400/800
Format: Disk, tape.
Requirements: Disk/tape drive; 16K.
Approx. Price: $34.95

Shamus is another maze game with incredible high-speed action very much like **Berzerk**. The player maneuvers a Shamus (old slang for detective) through a series of mazes. Along the way, he or she must survive a determined onslaught by ten to twenty bad guys in each room. The Shamus throws shivs at the attackers, and they retaliate with an incredible array of missiles. Just staying alive is an accomplishment; and if you dally too long, an indestructible Phantom will appear, to drive you to the next room.

The objective is to make your way through hundreds of rooms, collecting keys. The keys enable you to unlock doors which will allow access to lower parts of the maze. At the lowest level, the Phantom can be destroyed. This is the ultimate goal of **Shamus**. Few reach it.

Shamus is a top-selling game for the Atari and a superior variation of the **Berzerk** format. The color and sound are tremendous, and the animation is very well done. **Shamus** is for anyone who enjoys a good maze or shoot-'em-up game.

WIZARD OF WOR

From: Roklan
For: Atari 400/800
Format: Disk, cartridge.
Requirements: Disk drive; 16K.
Approx. Price: Disk, $39.95; cartridge, $44.95.

Wizard of Wor is best described as a combination of two more popular arcade games: **Pac-Man** and **Berzerk**. In this game, you and an optional partner are dressed like astronauts with air tanks and bazookas. Your goal is to wander through a maze and destroy a band of unpredictable monsters. Some monsters are only visible in certain portions of the maze. If you miss them, they will quickly materialize on top of you—and eat you. There's also a radar display (much like the radar in **Defender**) which you must keep in sight throughout the game. This is a very fast game, and you must keep moving to stay alive.

The home computer version of **Wizard of Wor** is a very good adaptation of the arcade game. While the picture is not quite as detailed as in the coin-op version, the graphics and colors are very well done, and the sound effects are also quite good.

We suggest trying this game before you buy it. **Wizard of Wor** was only a moderate success as a coin-op game, and not everyone likes it.

GAME TYPE IV:

SPACE GAMES

Arcade games still mean "space games" to many people, because for some time most arcade video games were set in inter-planetary, interstellar, or intergalactic surroundings. They featured shoot-'em-ups with photon torpedoes, high-speed chases at warp speed, and other out-of-this-world adventures.

Among these video game pioneers were the classic **Star Trek** game and **Asteroids** (a battle between the player and tumbling space-rocks). **Defender** is a popular shoot-'em-up game that requires quick reflexes to defend humanoids on a planet's surface from invaders who try to kidnap and mutate them. **Galaxian** is another classic—in which waves of aliens dive at the gunner (you), and the trick is to destroy them before they get you—but **Space Invaders** is the game that caused the video explosion in the arcades.

What makes a space game? The most obvious criteria is that the action happens in space, but there are some other common factors, as well. Space games almost always have a "fire button" that, when pressed, shoots either lasers or photon torpedoes at enemy ships. You'll usually find that the ratio of enemies destroyed to your own casualties is very much in your favor. For example, in **Space Invaders**, you can knock off hundreds of aliens before one of your bases is destroyed. No clever maneuvering is necessary—just blast away.

Space games are all futuristic games. They are set in a time when people live in space. Though they seem to foretell mass destruction, they really offer a disguised hope: if we have survived long enough as a race to battle aliens in the stars, then we will have done pretty well.

THE BEST SPACE GAME:

STAR RAIDERS

From: Atari, Inc.
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $44.95

The usual space game shoot-'em-up has an impersonal quality to it. In **Galaxian** and **Space Invaders**, for example, the player operates a ship which moves back and forth across the bottom of the screen and shoots upward at descending aliens. It is difficult to become involved with this spectator's point of view; the danger seems very remote.

A computer game designed to overcome this problem might make you (the player) pilot of an interstellar fighter. Your view would be that of a pilot through the window; you would see stars shooting by and periodically have to avoid passing planets. When you finally engaged enemy fighters, you would attack from (and be attacked while) inside the ship, rather than being out in space.

Does this sound like a winner? It is—and Atari has a game which matches the description exactly, called **Star Raiders**. **Star Raiders** was among the first Atari games available and has been responsible for the sale of many Atari home computers. It is a perennial favorite among computer owners (and is frequently copied by other manufacturers). **Star Raiders** effectively announced to the world that Atari computers were a revolution in computer graphics; look at it, and you'll see why. Its graphics are stunning.

Star Raiders is the best game of its kind. Nothing compares favorably with its realistic simulation of interstellar combat; it is the only game that puts you into the cockpit and lets you experience what a space fighter would encounter.

You do not look down at the top of the ship; you sit in its cockpit. The enemy torpedoes are not little white lines shooting down the screen; they are swirling, glowing masses, headed directly between your eyes. And instead of shooting torpedoes up into swarms of aliens, you shoot at them from your ship (in true 3-D perspective). You can even see the dim blue glow of the defensive shields in front of you. You are actively and personally involved in the battle.

The controls are easy. Put your defensive shields up; turn on your attack computer and your automatic tracking. Locate the firing button on the joystick, and let the ground crew finish refueling the ship.

Start the engines at an easy pace (Warp 5) and watch the stars slowly crawl by. Next, examine the galactic map. There are three enemy ships two sectors away. Go into hyperwarp, and the stars start to go by faster and faster, until you slip swiftly into hyperspace.

There is a moment of stasis as you slip out of space and back in again. Suddenly the alert klaxon sounds and enemy ships approach. Move quickly now. Destroy the fighter before it gets off a shot! But, look, its torpedo is already headed your way. You see its evil glow as it heads straight for the ship. Your computer has targeted the torpedo, however, and one of your own shoots out to intercept the enemy bolt. One more shot and the enemy blows up; you fly through the still-glowing debris.

The galactic chart is a map of the galaxy in the form of an 8 by 16 grid. It indicates the position of Starbases and enemy ships.

The stars blur past as you are propelled into hyperwarp speed, making the jump to another part of the galaxy.

Your Starbase, shown here in yellow and orange, is a place where you can repair damage and refuel. Docking, however, is not always successful, as shown above.

But you're not out of trouble yet. A blast rocks your ship. The shields flicker but hold against the force of the explosion. The computer's lights go off, and your radio goes silent. The blast that came from behind has torn up your ship. You switch to a rear view and see the culprit: a powerful enemy Base Star.

Two enemy torpedoes are headed your way. You fire desperately, trying to stop them, but your photon torpedo tubes have been damaged too. Both missiles collide with your ship; they explode, and in a blinding flash your shields give out. Now you are helpless. The smallest enemy blast will destroy you.

The Base Star launches two more enemy torpedoes. You can't outmaneuver them, so you press the hyperwarp button. It takes time to accelerate to hyperspace speed. The torpedoes are closing on your defenseless ship—growing bigger in your viewscreen, glowing and rushing straight at you. Finally the hyperdrive hums and you draw away from the Base Star; then you suddenly slide into hyperspace.

You have escaped.

PLAYING THE GAME

Your objective is to destroy a galaxy full of enemy Zylon ships and save your Starbases from destruction.

The primary controllers are joystick and fire button. Pull back on the joystick to climb, push forward to dive; right and left will turn you accordingly. The firing button launches torpedoes from alternating sides of the ship; if the computer is locked onto an enemy target, both photon torpedoes will fire at the same time. The following keyboard controls are also active:

A: Shift to aft (rear) view
F: Shift to forward view
G: Shift to galactic map
C: Computer on/off toggle (can be damaged)
T: Computer tracking on/off toggle (can be damaged)
H: Hyperdrive on switch
S: Shields on/off toggle (usually only on!; can be damaged)
0—9: Set Warp 0—9 (can be damaged)

Photon torpedoes serve as your only weapons against the dreaded Zylons. They explode on impact when they hit a Zylon soldier, torpedo, or Base Star. Torpedoes consume little fuel, so you can fire lots of them.

The shields provide your only defense against incoming enemy torpedoes (except that your own missiles can intercept enemy shots before they get too close). The shields will keep an enemy blast from destroying you, but they will not always prevent damage. If your shields drop, you are in mortal danger; one more hit and you're dead.

The engines take you from Warp 0 to Warp 9 and act as the ship's accelerator and brake. Warp 6 or 7 is a good cruising or fighting speed; Warp 9 is generally used only for emergencies.

The galactic map is an 8 x 16 grid showing the 128 sectors that comprise the Galaxy; it also shows Starbases and enemy ships. With this map you can select to what sector you would like to hyperjump.

The hyperdrive propels you on such a jump instantly (once it has built up enough power). Hyperdrive is mostly used to move to a sector where enemies are located, or to a Starbase for refueling.

Your Starbases are your sole means of support. You can dock at a Starbase, refuel, and repair damage to your systems. The enemy will try to destroy your Starbases to cut you off from support. They do this by completely surrounding a Starbase's sector; after one minute, the Starbase blows up, and the enemy uses the wreckage to build more enemy Base Stars.

There are two types of Zylon fighters, each as threatening as the other. As your primary opponents in a dogfight, they attempt to damage and eventually destroy you with their torpedoes.

Enemy torpedoes can damage your ship if they explode against your defensive shields. When this happens, you have to go to the Starbase for repairs, which takes time and reduces your rating. You will have to judge how critical the damage is: losing your subspace radio is not too critical, but a damaged galactic map will not update until you get it fixed—which could cause you to lose track of the enemy.

Base Stars are enemy "carriers" with heavy firepower. They are dangerous to tangle with, because they move quickly and fire many torpedoes. Allowing the computer to "lock on target" is one good way to destroy a Base Star.

When you can center the enemy exactly in the mid-screen crosshairs, you should always put the computer in the "Locking on Target/ Attack Computer" mode. At that point, the computer will "lock on" the enemy, and if you fire, two torpedoes will be launched together under computer control and track the enemy. If you keep firing, subsequent torpedoes will also track, and the enemy will probably be destroyed. Your first wave of torpedoes will intercept any that the enemy fighter has launched, and your second wave will hit him.

At the start of the game, you select one of four modes of play. In the lowest level (Novice), enemy ships cannot damage your ship; in the upper three levels they can. The higher the level, the more each enemy hit damages your ship. If you manage to survive and destroy all of the enemy forces, then you will be given a rating based on a complex evaluation of your performance: how much damage you sustained, how many times you had to dock at Starbase, and so forth. The ratings range from Garbage Scow Captain to Commander Level 1.

STRATEGY

The enemy is constantly going after your Starbases. Your primary strategy must be to follow his ships and keep him away from (prevent him from completely surrounding) your Starbases. If a Starbase is about to be destroyed by the Zylons, you should destroy it first. This prevents the wreckage from being used to build more enemy ships.

Be sure to use computer tracking at all times. It will automatically shift you from front to back view when an enemy switches position, keeping him on your screen. Remember that if you fire to the rear your controls work backward.

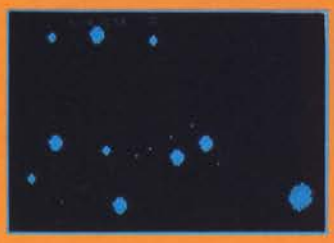
If your shields go down, hyperwarp immediately and put the joystick to one side hard. It takes some time to build up enough speed to get out of a sector, and putting the joystick to one side will help you avoid incoming torpedoes. Keep firing. Don't be afraid to waste torpedoes if there's even a chance they will do any good.

One of the two types of fighters is on this screen. The other has been destroyed in a dogfight, and only the debris remains.

Your first wave of torpedoes will intercept any enemy torpedoes; the second wave will destroy the enemy ship, as above.

Be aware of a "bug" in the game concerning torpedoes: if the plotted position of your torpedo and an enemy torpedo or ship happen to be the same, the torpedo will go off and the enemy will be destroyed. There are no range considerations! Using this to your advantage, you can take out enemy fighters by staying in the lower plotted area of the screen, firing constantlly, and trying to maneuver them into your two torpedoes' lines of fire. This works even better than using the targeting computer to lock onto an enemy, since the latter can be quite difficult.

Good luck with **Star Raiders**. Remember that the Jedi, Captain Kirk, and Commander Adams are all with you in spirit, so don't give up against the dreaded Zylons.



ASTEROIDS

From: Atari, Inc.
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $34.95

Asteroids is a game in which you and your spaceship are surrounded by floating asteroids. You must blow them up, and at the same time avoid collisions. In addition, enemy ships periodically come through shooting, just to keep you on your toes.

Asteroids was one of Atari's first big coin-op hits. The home computer version of **Asteroids** is not as visually spectacular as the coin-op version, however, because the game cartridge has to be able to work with very limited memory. Just as the VCS version of **Pac-Man** is much different from the coin-op game, Atari's home computer **Asteroids** is much different than what you've seen in the arcades.

The home version does have some advantages. Up to four people can play simultaneously (either cooperatively or against each other), which puts it in the company of very few other games. Having multiple players makes the game less like **Asteroids** and more like **Spacewar** with obstacles. It can add a lot of excitement to the battle, especially if you are quite good at the game: nothing is more boring than waiting for someone else's turn to finish.

GALAXIAN

From: Atari, Inc.
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $44.95

Galaxian evolved from the enormously popular arcade game **Space Invaders**. In **Space Invaders** ranks of aliens are lined up at the top of the screen. They march back and forth moving down toward the bottom of the screen. You follow their movements from under protective shields and fire up at them. You are awarded points for the enemies you destroy, but eventually they overwhelm you.

In **Galaxian** this scenario takes on a new additional element. The aliens start by marching in formation above you, but periodically either one or a group of them will dive down at you. The farther you get into the game, the more aliens dive, until you are eventually overwhelmed and destroyed. Having to fire up at diving aliens who sometimes attack in wild parabolic formations can be quite a challenge. Destruction comes when you collide with either an alien or an alien missile.

We recommend **Galaxian** to anyone who has a taste for mild shoot-'em-ups with some strategy required.

GAUNTLET

From: Avalon Hill
For: Radio Shack TRS-80 Color Computer
Format: Tape
Requirements: Tape drive; 16K.
Approx. Price: NA

Requiring joysticks, this blend of **Asteroids** and **Space Invaders** doesn't have great graphics, but its $20 (approximate) price and availability to 4K machine owners make up for that shortcoming.

You pilot a spaceship from which you face an onslaught of enemy alien ships and two kinds of obstacles: huge green and small yellow asteroids. Hitting one of these ends the game in a outer space tragedy. You can either try to avoid them or shoot your way through. Also rushing at you are bluish aliens. Hitting one once disables its firing mechanism but leaves it still dangerous if you run into it. A second hit explodes it, and then you must avoid its deadly debris. You control your speed and maneuver through the field with the joystick, which is quite responsive in this game.

As a game, **Gauntlet**'s combination of timing, scoring, and manipulation of screen elements makes it fun and acceptable for all ages.

GORF

From: Commodore Business Machines, Inc.
For: Commodore VIC 20 and 64
Format: Cartridge
Requirements: Appropriate cartridge.
Approx. Price: VIC 20, $39.95; 64, NA.

If you liked **Space Invaders** and **Galaxian**, then **Gorf** (backwards for "frog") is for you. **Gorf**, a perennial coin-op favorite, has now been faithfully translated for Commodore computers. The game features an alien spiraling out from the middle of the screen, expanding as it moves, and enemy flagships (which you must destroy before they get to you).

Gorf begins with a classic **Space Invaders** set-up with rows of aliens firing down at you. Once you repel the first attack wave, the aliens begin to dive out of formation (**Galaxian**-style). Two of them shoot solid beams that you cannot run into. Next you confront a shooting Circle of Aliens, which is very difficult to destroy; finally, you meet the Alien Flagship, which must be hit dead center (in the reactor core). This is one tough shot! If you get this far, you move up a rank, and the whole thing starts over.

This game is well done, with excellent sound and graphics. It will challenge your reflexes for quite some time. **Gorf** is a good game for anyone who wants to try a slightly different shoot-'em-up.

OMEGA RACE

From: Commodore Business Machines, Inc.
For: Commodore VIC 20 and 64
Format: Cartridge
Requirements: Appropriate cartridge.
Approx. Price: VIC 20, $39.95; 64, NA.

Omega Race, reportedly Commodore's most popular game, features fast, arcade-style action. You are an Earth ship, and your mission is to destroy (for points) and to evade (for survival). Your opponents include two kinds of mines (photon and vapor) and three kinds of ships (droid, command, and death).

At the beginning of the game, you have the advantage: droid ships are your main opponents, and your firing range is longer than theirs. This means that by hovering near the edges of the screen you can shoot at them without even having to dodge their shots. You want to shoot as many as you can as fast as you can, too, because while the droid ships stay in a group early, they separate as the game goes on, which makes them much harder to destroy. One final tip: when you've got only one enemy ship left on the screen, knock out as many mines as you can before hitting the final ship.

Omega Race can be played with joystick, paddles, or keyboard; take your pick. You also get to choose your own screen colors for the game, a very unusual option.

PARSEC

From: Texas Instruments
For: TI 99 4/A
Format: Cartridge
Requirements: Standard memory.
Approx. Price: $39.95

Parsec combines many of the best features of arcade games. Like most space games, **Parsec** puts you in command of a fighter equipped with a laser for defense. Unlike many other space games, in **Parsec** your enemies change often, in both design and skill.

Parsec requires changing strategies for the different enemy ships. The waves of small fighters are easiest to deal with: by shifting altitude and repeatedly firing, you'll eliminate these ships with relative ease. The attack cruisers require more preparation: when the alarm sounds, start close to the ground, and begin firing while moving up and down. Enemy saucers and asteroid fields offer the most difficulty. Since the saucers come from behind, you can't fire accurately until they have moved across the screen. Fly at maximum altitude when they appear; then drop to match their altitude before firing. The best defense in the asteroid belt is a heavy hand on your laser. But be forewarned: your laser will overheat and destroy your ship if you overdo it. With its various types of enemy craft, **Parsec** is one game that won't lose its challenge after the first week.

SPACE INVADERS

From: Atari, Inc.
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $34.95

It is entirely fitting that **Space Invaders** be included among our brief list of extra-terrestrial adventures.

In this classic game, you defend a Moon Base from attacking aliens. You fire from behind defensive shields which intercept a number of enemy shots before crumbling. The aliens are lined up in rows at the top of the screen, moving back and forth slowly. Each time they move completely to one side, they drop down a level closer to your ship. If they reach your level, you are destroyed (just as you are if you'd been hit by one of their shots). The secret to this game is to destroy the aliens in the end columns. This increases the amount of time it takes for the groups to march back and forth; thus it takes them longer to descend.

The version from Atari is not exactly true to the original. For purists who want the look and feel of the original arcade version, Roklan has produced **Deluxe Invaders**, which provides an entirely satisfying copy of the original coin-op **Space Invaders**.

ZAXXON

From: Datasoft, Inc.
For: Apple IIe/Plus, Atari 400/800, Radio Shack TRS-80 Color Computer.
Format: Disk (Apple, Atari, Radio Shack); tape (Atari, Radio Shack).
Requirements: Disk/tape drive; Apple, 48K; Atari, 16K (tape), 32K (disk); Radio Shack, 32K.
Approx. Price: $35.95

Zaxxon is well known to frequenters of video arcade parlors, and this version is official: faithful to the original and licensed to Datasoft by its distributor, Sega Enterprises.

In **Zaxxon** you plot a ship over a hostile space station armed with planes, missiles, guns, and other destructive forces. If you make it over the station, you face more problems in outer space, where you meet enemy spaceships which you must also destroy. The goals are to destroy ships and to survive for the final encounter with the evil robot Zaxxon.

This game is noteworthy in its departure from the flat screen for a three-dimensional feeling. The space station appears to be quite solid, and you fly over it as if you were sailing into the screen at a rightward 45-degree angle. This excellent use of graphics adds realism to the proceedings.

GAME TYPE V:

STRATEGIC ROLE-PLAYING GAMES

While all computer games exercise a player's imagination to some extent, there are some games that rely heavily on strategic role-playing. The games in this section all require very little in the way of reflexes, so those of you who are destroyed in the first ten seconds of **Defender** might find these games a great deal more enjoyable.

Role-playing games require that you develop your own game character—an alter ego with special abilities and attributes (a fighter, thief, or wizard, for example). Some role-playing games even require that you create an entire team of computerized heroes and heroines; and you and your character(s) must face a variety of challenges waiting in the computer's adventure-style world.

Generally, it takes a long time—perhaps months—to fully develop a character. Given enough time (and enough hours of play) your character can acquire experience, intelligence, stamina, and other heroic attributes; he or she can then explore new computer worlds, or join friends' characters in new games. Should you take a cautious approach toward your computer-generated "life," a character can last until he or she dies of old age. Naturally, a more reckless method of play may shorten the game as well as your character's life span.

This need to make a choice of lifestyles—the decision between caution and fast-paced excitement—is perhaps the greatest attraction of role-playing games. Role-playing games allow you to escape for a while into imaginative, exciting, dangerous worlds—all constructed and maintained within a computer. Because the computer is so sophisticated, these alternative worlds can seem very real, and once you make the involuntary mental jump from sitting passively in front of a computer keyboard to wandering actively through an endless, dangerous, treasure-laden dungeon, you will be hooked on role-playing games.

WIZARDRY

From: Sir-Tech Software
For: Apple IIe/Plus, IBM PC.
Format: Disk
Requirements: Disk drive; Apple, 48K; IBM, 48K.
Approx. Price: Proving Ground of the Mad Overlord (Apple, $49.95; IBM, NA); Night of Diamonds (Apple, $34.95; IBM, NA); Legacy of the Llylgamyn (Apple, $39.95; IBM, NA).

Wizardry is by far the best strategic role-playing game available today. You and five other members of your party are about to descend into a dungeon. You have some gold with which to buy weapons; however, it is such a small amount that you can afford only poor quality weapons. You can also buy armor and shields (but, once again, you get what you pay for).

You get six characters: try two fighters, a thief, a priest, and two mages, like this.

Since each of the six characters is different (fighters, priests, mages, and others), each has its own special abilities and can only use particular kinds of weapons. Priests, for instance, can only use specially anointed weapons. Neither they nor the mages are very good at fighting, but they come in very handy for spell-casting. Priests also tend to be good at healing the wounded—of which there will be plenty.

Each character is assigned a name and capabilities. Then the character has to prove its skill.

Once your adventurous team is equipped, you head off for the Proving Grounds of the Mad Overlord; there you enter into the maze.

A 3-D view of the playing "field" is given in the upper left corner of the screen.

PLAYING THE GAME

Instead of the usual overhead birds-eye view of the maze, **Wizardry** provides a 3-D view—showing all of the walls, doors, and rooms around you. The surroundings change as you wander along, so you must begin to construct a map.

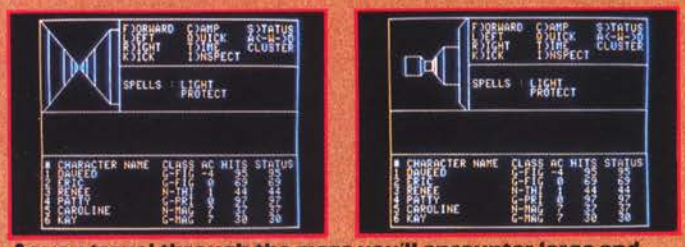
Suddenly, as you're exploring the maze, you hear an eerie scratching sound that raises the hair on the back of your neck. Out of nowhere, five grim skeletons materialize in front of you with their weapons ready. And as if that weren't enough, behind them are three bubbly, ugly-looking slimes. A slime's touch is poisonous and may kill you before you can escape the maze to find an antidote.

The priest tries to dispel the undead skeletons. Three of them are caught by the backwash of his spell and fade away; the other two rush forward. The mage steps back and casts a Katino spell, which puts the three bubbly slimes to sleep. The two fighters move forward with their short swords. One hacks a skeleton to pieces, but the other misses his stroke and the skeleton's sword gives him a grisly wound. The mage casts another spell, and the remaining skeleton is blasted by fire into small scattered pieces of bone. This leaves the unwounded fighter free to finish off the spellbound slimes.

It isn't too long before you realize that all this work was not futile: you spot a treasure chest. The thief scurries forward greedily and inspects it. "Gas bomb," he says, "but I think I can defuse it." He does, and upon opening the chest, the group finds 120 gold pieces. The booty is divvied up six ways, providing each character with $20 worth of the Overlord's cash.

After this it's back to the castle (the top) for healing and better weapons. Each member of the party has become more worldly through these experiences. As their wounds heal, they have time to study new spells and increase their powers, but then it's back down into the dungeon to explore its bizarre secrets and surprises—the teleporters, strange signs, pits, elevators. . . .

Getting started may be the hardest part of this game. You have a limited amount of gold to use to buy weapons for your characters. Some "prices" are given on the screen above.



As you travel through the maze you'll encounter large and small rooms and intersections (as above)—map these. The Light spell, which your priest can cast for you, lets you see hidden doors.

Caroline, the mage in this player's game, casts a Halito spell to engage the monsters in battle.

STRATEGY

The real trick to **Wizardry** is getting started.

Unfortunately, this takes quite some time. You must go through the process of creating and outfitting six characters. Without companions, you will be doomed, so always plan to journey down with six. But what kind of characters should be in your six-party group?

The best combination we have found is two fighters in the front, followed by a thief, a priest, and finally two mages.

The first three members in the group do all of the fighting and are the most likely to get hurt; hence, we put the fighters in front. The thief can also fight well, so he goes third. The priest and mages, who don't fight well at all, go in the second group of three and are thus better protected from physical danger.

Once you have your group equipped and assembled in their proper order, you're ready to enter the maze. You should enter the maze facing north and immediately begin to map it. As you proceed, you will enter both large and small rooms and cross intersections. You should also map these.

All humanoid monsters respond well to the Katino spell, which puts them to sleep. Once asleep they are helpless, and your fighters can walk up and skewer them. The mages will probably deliver the Katino spells. If you run into a particularly large group of monsters, you may want both mages to Katino the group; sometimes a spell will fail from one mage, but not from both. The mages can also use the Halito spell for engaging one monster, and it is generally handy for fighting. When your mages learn new spells, the Mahalito and Lahalito, they will be quite effective against even powerful monsters.

Your priest is useful for casting a Light spell (Milwa/Lomilwa), which enables you to see "hidden" doors and extends your view down the corridors. He can also cast the Dios spell, which helps heal damage done to the party members.

Above all, remember to play conservatively. After you have pirated away a bit of loot, head back to the castle and re-equip your characters with the best armor and weapons that you can buy (and they can use). Then go down for another stint, come back up, and so on. It costs $10 a point to have damage (measured by hit points) healed in the castle; so if possible have your priest heal the party completely before you come back up.

Keep track of the activities of your priests and mages. They only have a limited number of castings for each level of spell. Both characters are "recharged" automatically for free when they stay at the castle Inn, but don't get caught down in the dungeon when the spells run out. Start your trip back when you still have one or two potent spells left, just in case you encounter something on the way up.

Be forewarned that the dungeon has a number of traps and tricky features. There are one-way doors, teleporters (which instantly move you to another spot), and pits to fall into (which will injure everyone in your party). Map all of these obstacles! To help

orient the party when you are teleported, use the mage spell Dumapic—it will give you your exact position with regard to the stairs. You can also cast a Dumapic to find out where you've landed; then, extend the map to that point and you can be off.

There are also areas of darkness, where you can't see anything. Light spells will not work, so patience and thoroughness are important here. Take one step at a time. Locate all the walls. And gradually you will be able to map the unknown area. Be sure to open doors whenever you come to a wall; sometimes there are doors which you can't see and which hide astonishing things.

There will be situations that you just can't handle. If you're low on spells and your fighters are low in vitality, don't tangle with six, potent, Level 4 Ninjas. Run away—the faster the better! Remember that discretion is the better part of valor.

The writers have not yet discovered how to handle Murphy's Ghost. Level 5 spells do not seem to touch it, and the fighters cannot hurt it. Our advice is to take the money (treasure) and run.

Mahalito and Lahalito are very potent spells. If you're on Level 3 or Level 4, cast them twice (with both mages), just in case a particularly powerful monster manages to survive the first casting. These spells affect every monster in one group and are meant to be lethal. Makanito is also effective and kills outright any monster of less than Level 8 strength. This is best saved for emergencies.

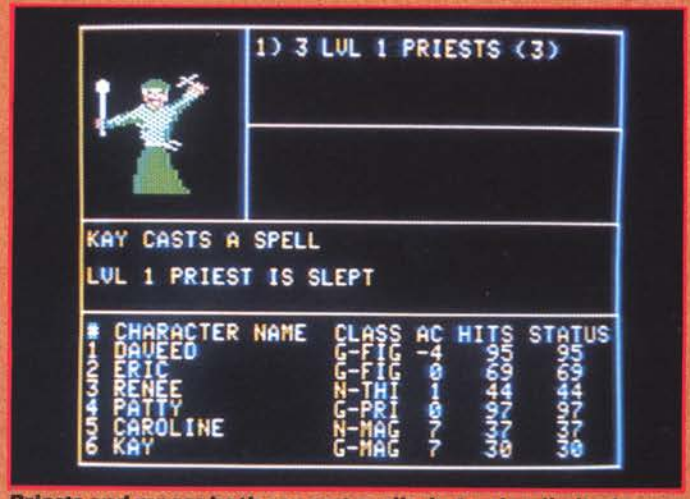
Keep a good supply of Dialko and Latumofis spells handy; these cure paralysis and poisoning, respectively. Note that the priest's role in spell-casting is that of healer, and the mage's role is that of a fighter. The one exception to this rule is the priestly spell Montino, which prevents the enemy from casting spells. Use it on any enemy who seems likely to use spell-casting—an enemy mage, for example.

Generate back-up characters. When you have a good group going, leave one behind on each trip and take along a greenhorn instead. The new member will gain experience fast, and this way, if you ever lose one of your members, it won't be too difficult to "build up" a new one.

Following the directions in the manual, make a backup copy of the scenario disk as soon as possible; otherwise you will wear out your master **Wizardry** disk. Then run your game from the backup disk.

Be SURE to type an "L" (for "leave") before you switch the power off; this writes the current status of the game to disk, and your characters will remain where you left them. If you neglect to do this, you will have to recover the characters from the "Utilities Page," and you will lose all that you accomplished in the previous trip. The "L" command is one of the Mad Overlord's most devious traps. On the other hand, if your party is really chewed up in the maze, and there seems to be no other way out, then turn the power off (or just reset the computer); when you recover the characters, they will be in the condition they were when the last trip started. In this case your conscience is your only guide.

When your party kills the monsters, you win not only gold pieces (so that you can buy more weapons), but also experience points, an indicator of their growing capabilities.



Priests and mages both can cast spells, but only a limited number, so keep track of how many you have used. Otherwise you may find yourself unable to ward off the monsters.

Since Daveed is a fighter, you will probably press "F." If you encounter something more than you can handle, run away!

The "L" command to end the game is one of Mad Overlord's (i.e. the programmer's) most dastardly tricks. If you forget it, you'll lose everything you've won during the round.

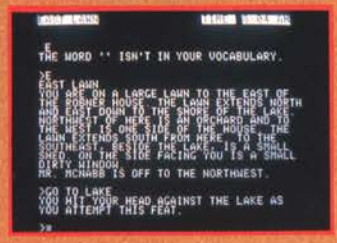
ALI BABA AND THE FORTY THIEVES

From: Quality Software
For: Apple IIe/Plus, Atari 400/800.
Format: Disk
Requirements: Disk drive; 32K.
Approx. Price: $32.95

Although **Ali Baba and the Forty Thieves** has been around for some time, it is quite sophisticated, even by today's standards. In this game, your computer transports you to the Far East to rescue a princess in distress. The game features a bird's-eye view of the action and nice music and effects.

Ali Baba and his companions work their way through a complex maze, finding treasure and fighting enemies. The companions can be created at will, which is good since they tend to die off quickly. The enemies are humans, with a variety of fighting capabilities ranging from the very strong to the very weak. You must develop strategies to get around them in your quest for the captive princess.

The game uses the Atari joystick for most commands, which means you can sit back in your chair and play the game, instead of having to prop yourself up in front of a keyboard. This is a comfortable, thoughtful design. **Ali Baba** can either be played alone or with others. The game is fun and is recommended for anyone wishing to trade in their usual evenings for exotic and challenging Arabian Nights.



DEADLINE

From: Infocom, Inc.
For: Apple IIe/Plus, Atari 400/800, Commodore 64, IBM PC.
Format: Disk
Requirements: Disk drive; Apple, 32K; Atari, 32K; Commodore, 32K; IBM, 48K.
Approx. Price: $49.95

There's been a murder at the Robner estate, and you must find the guilty party. You are playing **Deadline**, from the makers of **Zork**, and the world's best computer detective game.

In **Deadline**, you play the role of a detective investigating a murder. You wander around the estate asking questions and trying to figure out who poor Mr. Robner's murderer was. This is not an easy task. If you question the gardener, for instance, his answers will differ, depending on whether anyone else is present. Other characters you meet may become irritable and refuse to answer questions if you are rude to them. The depth of this game is stunning.

The **Deadline** package comes complete with the disk, a death certificate, some pills found near the body, coroner's reports, and other aids. It really sets the stage for your entry into this alternate but suspenseful reality. We highly recommend **Deadline** to anyone who has yearned to solve a murder mystery.

EASTERN FRONT

From: Atari Program Exchange (APX)
For: Atari 400/800
Format: Disk, tape.
Requirements: Disk/tape drive; 32K (disk); 16K (tape).
Approx. Price: $29.95

It is 1941. You are commander of the German armies. Your assignment is to attack and take the Soviet Union.

Historically, this plan didn't work. But you can change all that in this immensely detailed simulation, if you avoid making the same mistakes that the Germans did.

History, at least in this case, can be rewritten. The Soviet troops can be defeated and Moscow taken. Figuring out how it can be done will take you some time, but that's the fun part. The computer calculates the Soviet moves and is no slouch as an opponent. This is a wargame for people who are sure they will hate wargames, or for people who have never tried them.

Eastern Front was created by Chris Crawford, an ardent wargamer at Atari. It is a superb feat of human engineering—requiring only a joystick to play, instead of a long, boring list of commands.

The graphics consist of a very good, highly detailed, bird's-eye view of a small area in the Soviet Union. This "window" may be scrolled in any direction, and allows you to cover the entire area of conflict in great detail.

GALACTIC EMPIRE

From: Broderbund Software, Inc.
For: Apple IIe/Plus
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $24.95

Congratulations, Commander. You have been given the awesome responsibility of freeing the galaxy from the evil Tawala. You are aboard the flagship of the fleet, a fleet capable of awesome power. With the proper combination of fighting and diplomacy, you may conquer and hold the twenty inhabited worlds of the center system.

It won't be easy, however; there are many commands to remember and a hefty reference book that you can expect to refer to frequently. The special graphic and sound effects will keep you entertained as you frantically look up the command to blast at an enemy ship or to land and occupy a planet.

Cryogenics is just one of many things you must plan for; trips between planets take hundreds of years, and you'll find suspended animation necessary. You'll also have to draw up local and galactic maps (with the conveniently provided booklet of blank, gridded maps) and keep track of population increases. This role-playing game is tough. Only the most dedicated, and studious, are likely to succeed.

THE SHATTERED ALLIANCE

From: Strategic Simulations Inc.
For: Apple IIe/Plus, Atari 400/800.
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: $39.95

If **Eastern Front** was meant for people who don't like wargames, then **Shattered Alliance** (the first part of the **Chronicles of Osgorth**) is for people who love them. This is a complex game, with many tables to look up, decisions to make, and tasks to accomplish.

The action takes place on Osgorth, an area ravaged by wild conflict. You command one set of troops, and an optional second player commands the enemy. If there is no second player, then the computer will oppose you.

Once the enemy troops have been armed, the computer generates a terrain map over which the game is played, including obstacles such as mountains or trees. You fight a series of tactical battles and win the game by conquering Osgorth.

The well-done colored graphics show a bird's-eye view of the terrain, army movements, battles, and other events.

The Shattered Alliance is designed more for the ardent wargamer than for the average computer gamer. If you enjoy wargaming, then by all means try this game.

THE STONE OF SYSPHUS

From: Adventure International
For: Apple IIe/Plus, Atari 400/800.
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: Apple, $29.95; Atari, $39.95.

Some strategic games take themselves too seriously, and this can have a negative effect on the player. After all, it is difficult to make a decision which will affect the lives of billions of people in a galaxy.

The Stone of Sisyphus is a real relief in the wake of such demanding games. It is part of Scott Adams' **Maces & Magic** series and represents a genre of exploration and strategy games (with a bit of the classic **Adventure** added as a backdrop).

Although **The Stone of Sisyphus** is not an easy game to play, it is a great deal of fun, because the authors put a lot of humor into it. For instance, when you meet the Weapons Store owner, he mentions that you might possibly meet some monsters (*cough*, ahem) in the dungeon, so perhaps you would like to look at some weapons—only of the Finest Quality of course. The Weapons Store owner is a fine salesman (better than you find on most used car lots).

The Stone of Sisyphus is a good strategy game made great by the humor.

TEMPLE OF APSHAI

From: EPYX/Automated Simulations
For: Apple IIe/Plus, Atari 400/800, Commodore 64, IBM PC, Radio Shack TRS-80 Color Computer.
Format: Disk, tape.
Requirements: Disk/tape drive; Apple, 48K (disk); Atari, 32K (disk); Commodore, 64K (disk); IBM, 64K (disk); Radio Shack, 16K (disk), 16K (tape).
Approx. Price: $39.95

Temple of Apshai was one of the first computerized role-playing games and is responsible for many of the other strategy games in this section.

In **Temple of Apshai**, you create a character and outfit it with weapons. Then you enter the maze that comprises the Temple of Apshai. You get a bird's-eye view of your character and all the objects in the room.

You must fight off everything from mosquitoes to dragons during your quest, using a variety of weapons, including swords and magic arrows. Once you find enough gold, you can buy better weapons which will help you fight more terrible monsters.

Because the **Temple of Apshai** display has relatively low resolution, it can be generated on most computers without difficulty. This means that **Temple of Apshai** is available for more computers than any other role-playing game on the market.

ULTIMA I (AND II)

From: California Pacific Computer Co. (Ultima I), and On-Line Systems (Ultima II).
For: Apple IIe/Plus, Atari 400/800.
Format: Disk
Requirements: Disk drive; 48K.
Approx. Price: Ultima I, $39.95; Ultima II, $59.95.

Welcome to **Ultima**, a complete fantasy role-playing world.

Ultima may sound like a rather egotistical name, but it really isn't. This is a HUGE, wide-ranging game which comes complete with a very classy map and enjoyable documentation. In many ways it is much larger and more far-reaching than **Wizardry**; in fact, there is a running argument among computer gamers over which game is superior.

Ultima I is so huge that it is a bit intimidating; who wants to start a game that seems like it will take six months to finish? You have to explore not only outer space but also the planet, and in the planet are many **Wizardry**-like dungeons—all with lots of evil things awaiting your arrival. There are many kings to bargain with, treasures to find, mazes to explore, and a solar system to map.

Finishing **Ultima** requires real determination. It is no trivial game to be won in a few days or even weeks. If you are prepared to devote months to finishing a game, then try **Ultima**.

GAME TYPE VI:

THEME GAMES

Many computer games, because of their originality or individuality, belong in a category of their own. They're like popular songs that keep running through your mind—the themes are so familiar and unique you can't help but like and remember them. Therefore, we have chosen to group these games together in their own category, called theme games.

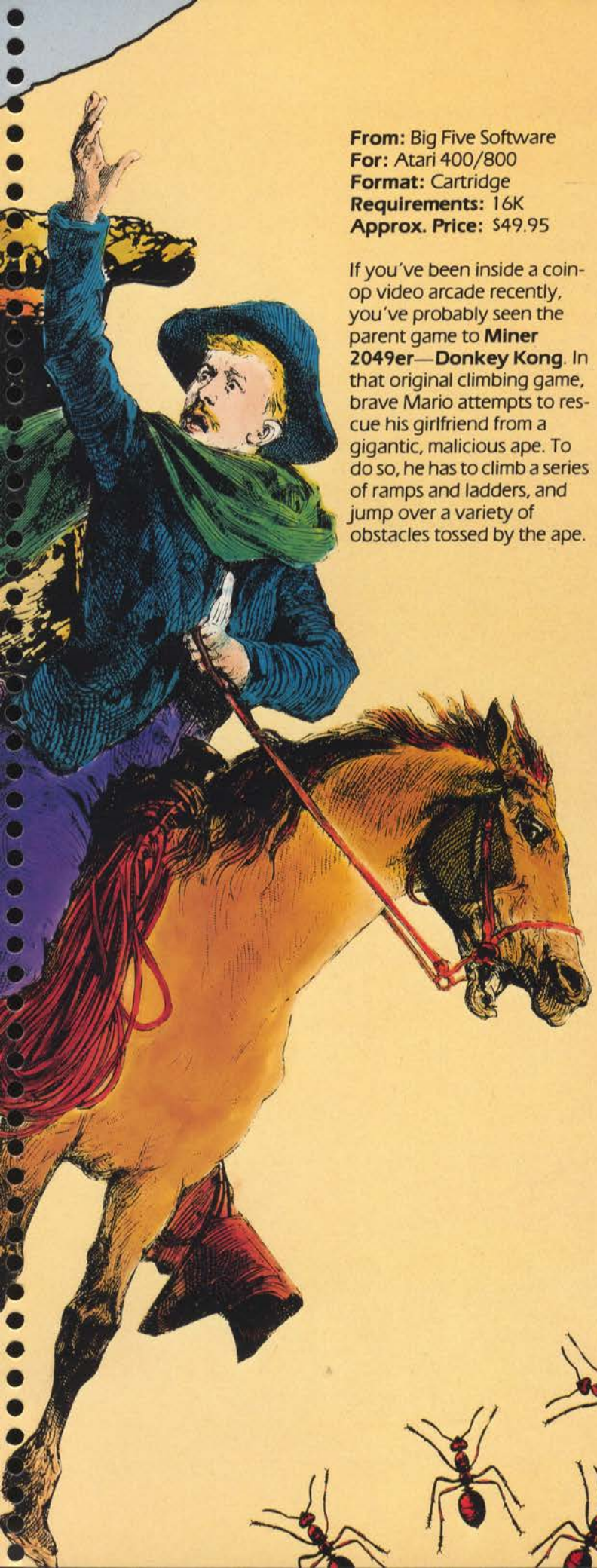
Consider **Picnic Paranoia**. Defending your picnic food from swarming insects has a universal appeal; anyone who spends a minute swatting at the onrushing ant armies is hooked forever.

Then there's **Centipede**, the classic shoot-'em-up that involves not spaceships or weird-looking aliens but oversized bugs that you might find in your own backyard. This game is different because the designers did not go with the usual attacking-alien cliche; instead, they took the setting from an ordinary earthly element.

With **Wrack 'em Up**, the Roklan software company created a simulated pool game with the complicated vector calculations required to aim the bouncing billiards, and the results are amazing. Just to sit and watch the array of bounces can be mesmerizing.

The games in this theme category are all wildly different from the norm. That's what makes them so memorable and enjoyable. A shoot-'em-up in a space setting is pretty passe, but a shoot-'em-up against spiders is something new (and pretty humorous, too).

MINER 2049er



From: Big Five Software
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $49.95

If you've been inside a coin-op video arcade recently, you've probably seen the parent game to **Miner 2049er**—**Donkey Kong**. In that original climbing game, brave Mario attempts to rescue his girlfriend from a gigantic, malicious ape. To do so, he has to climb a series of ramps and ladders, and jump over a variety of obstacles tossed by the ape.

Donkey Kong introduced a number of interesting ideas to video gaming: high-quality animation, ladders and ramps to climb, and finally, the concept of "levels," with different obstacles and challenges for each one.

A few games such as **Canyon Climber** imitate segments of **Donkey Kong**, but the clear winner of the hop, skip, and jump competition is **Miner 2049er** from Big Five Software. **Miner 2049er** uses most of the advanced graphic features of the Atari without hesitation or flaw.

The character in this game, a rather pudgy fellow named Bounty Bob, runs in fine animated style. When he climbs a ladder, you see him bend over at the top, just as a real person does when climbing a ladder. He even gives a small kick to his feet when he makes a jump. And should he fall too far, he smashes flat into the floor.

We consider **Miner 2049er** the best theme game because of its carefully plotted details—the fine joystick-controlled play, the colors, and the challenge.

PLAYING THE GAME

As Bounty Bob, your objective is to walk over all of the horizontal galleries (ramps) of a mining area without touching any of the monsters living there.

The monsters are awful-looking blobs which move back and forth (but fortunately, not up and down). If they touch Bounty Bob, he disintegrates, and you lose a player. On the other hand, when Bounty Bob touches one of the treasures, the monsters temporarily turn blue, and he can eat them for points.

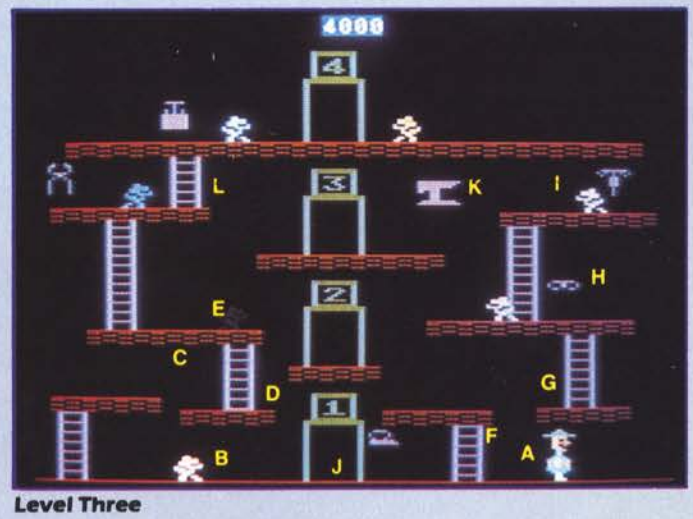
The galleries (ramps) are composed of tiny segments, each a few dots long; when you walk over a segment, it changes to a solid color. All of the horizontal segments must be changed to that color to complete a level. Ladders connect the different levels of the mine and can be climbed at any time by Bounty Bob.

When you "pick up" treasures (picks, shovels, and other mining paraphernalia), you receive bonus points and the monsters are temporarily edible.

Miner 2049er uses the Atari joystick for control. The button jumps you straight up if you are holding the joystick vertically. If you press it to one side, you will jump in that direction a set distance. If you press the joystick forward or backward you will go up or down a ladder, should you be next to one.

The standing jump, a move required in higher levels, is quite difficult. You MUST be moving before you can jump to one side; therefore you must move the joystick to one side and immediately press the button to achieve a standing jump. Expect this to take some practice; you will often find yourself jumping straight up.

Level Two

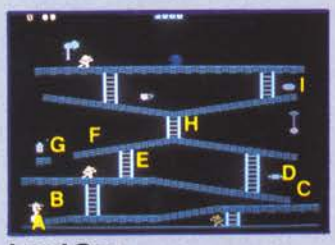


Level Three

STRATEGY

Level One

You begin the game at A. Jump up onto the ramp at B, moving to the left far enough to pick up the ramp sections you missed on the jump. Continue across to C, and then jump up to the next ramp and simultaneously pick up the treasure at D. Move left, chase the monster, and eat him. Finish that level to the left, climb the ladder at E.



Level One

Keep moving left, and when you reach the ramp three from the end, jump to the left (F). You will land squarely on the isolated ramp section (G) and collect a treasure.

Touching any ramp tiles you have missed so far, jump back to the main ramp and continue all the way to the right. Pick up the shovel treasure; then go back to the left and climb the ladder at H. Go to the right and pick up the treasure at I; then go up the ladder, across the top (eating both top monsters), down the ladder, and finish the third ramp.

Level Two

Level two introduces slides. If you are directly over a slide, you will drop down to the level below (sometimes many levels below). The trick is to clear the ramp tiles without accidentally going down the slides. This takes some careful maneuvering.

You start level two at A. Eat treasure B, and then go after monsters C and D to clear the bottom level. Climb the ladder and go right until you are exactly four squares away from the slide on ramp level one (E). There will be three unwalked tiles showing; be careful to only go far enough right to get to the fourth ramp tile away.

Jump over the slide to the right, and you will land on the tile closest to the wall. Carefully work your way left until you have cleaned up all three tiles; then jump left to clear the slide again. Climb the ladder and move left. Eat the treasure at F; then get under the monster on the isolated ramp and jump at G. Clear the ramp tiles at the right, and end (H) just as you did one ramp level below.

Go left from H and jump the gap. Keep working left until you have cleared all but the last tile on the middle, isolated ramp (at I). Then go right again until you are straddling the down slide at J, and do a standing jump left. You will land exactly on the tile you need to clear (at I). Jump left again, collect a treasure along the way, clear the rest of that level, and go up the ladder. Then, clear the second level from the top. Be patient here—do not jump when a monster is directly overhead.

Work your way right to the pickaxe at K, pick it up, and take care of the monsters on the top level. Then go back down to the second level from the top. Move right until you are just barely close enough to collect the treasure resembling a bow and arrow (at L). Don't go any farther right or you will fall down the slide. Go back to the left and up the ladder to the top; then go right and down again. Work left until you just barely finish the tile near the slide (at L); then work right until just two tiles remain uncleared. Go up the ladder and work to the right all the way.

You'll fall down to the bottom level on the slide at M, clearing the tiles there and on the isolated ramp. Clear the few tiles at N, and you will be through level two.

Level Three

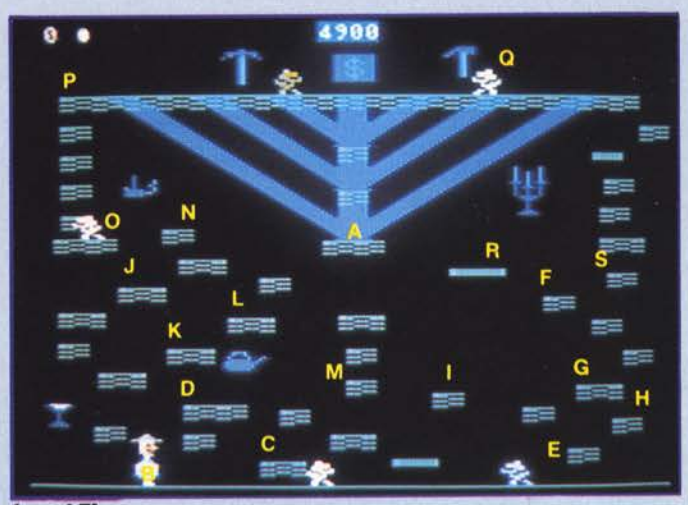
In level three you have new devices that will cause an excellent effect: transporters. They move you up or down inside their beam.

Starting at A, run and eat the monster at B. Immediately climb the ladder on the far left and jump to D; you can eat monster E at the top of your jump if you time it right. But you'll really have to hurry to catch monster E before the edible time runs out. Next, climb the ladder and finish monster E's level.

Go down the ladder and fall off the stairs onto the right. Don't worry—the fall is not far enough to kill you. Go right to F, climb the ladder, and clear all ramp tiles. Jump carefully to G (missing the monster above you) and clear that ramp. While the monster isn't too close, climb the ladder to H and eat the treasure. Then go after the monster. Immediately climb to I and kill the monster there. Clear the remaining ramp tiles and treasures on the right side. Then climb back down; you can "fall" the last step to hurry things up.

Step into the transporter at J, press "2" on the computer

Level Four



Level Five

keyboard and you will beam up to ramp level two, which you should clear. When the transporter returns to its normal color, it is ready for use again; beam up to ramp level three and clear it. When the transporter returns again to its normal color, eat the treasure at K and immediately beam up to ramp level four. Go left, quickly eat the monster and treasure, and then eat the other monster. There is not much time. Finish the top level, go down the ladder at L, and jump the monster coming your way. Eat the treasure and the monster, and you're done with level three.

Level Four

Things get a lot harder on level four. Start at A and climb the ladder at B, cleaning off the ramp. Go down the ladder and wait for the monster next to it to move a few steps away. Then chase him, eating the treasure just before you reach him, so you can also eat the monster just above. Make three rapid hops to the right (tough move) and eat the monster at C. Go up, left, right, and left to D; take your time and clean each ramp. There's no rush. Fall three levels to the bottom at E.

Run to the left, jump twice, and clear two ramps (to F).

Note that you must jump at the very extreme end of a ramp to make the next one up. Move right twice (to G). Then jump to H, collecting the treasure as you go. Move rapidly up three levels to eat the monster at I, and then you can take your time again. Jump from J to K and collect the treasure; then jump back. From K, jump to L and clear the ramp; then fall to M to exit.

You must jump to hit the destination ramp exactly; then jump your way back to I. Go up one, eat the martini treasure, go up one more, and fall on the monster at N. Fall once more to the right; then go up, eat the treasure, move left, left again, up, and up. Finally, climb the ladder to the top.

You must hurdle the monster at O, so you can get to the treasure (and then eat the monster). Wait until he is moving toward you; then climb the rest of the way up the ladder and jump him. Eat the treasure and both monsters. Then go down the ladder, clear the ramp at P, and make a very tough jump to Q so you can collect a treasure and finish the level. The last jump is quite difficult and must be made at the extreme end of the ramp. If you miss, you will end up at R (from which you can make your way over the top for another shot at it).

Level Five

Level five introduces the moving ramps. Timing your jumps onto them, when a misstep means falling to your doom, is nerve-racking. Some slides only exit onto a moving ramp (at A).

Start at B and go to C; then move left twice. Travel up to D. Collect the treasure as you are jumping right, and fall down to the bottom to clear the monsters. Make a standing jump all the way to E (on the rights side); then climb up to F. Fall back to G, then to H, then to the bottom, and jump to clear I.

Go back to D then move left and up to J. Then fall from J to K, jump up to L, and fall back to D.

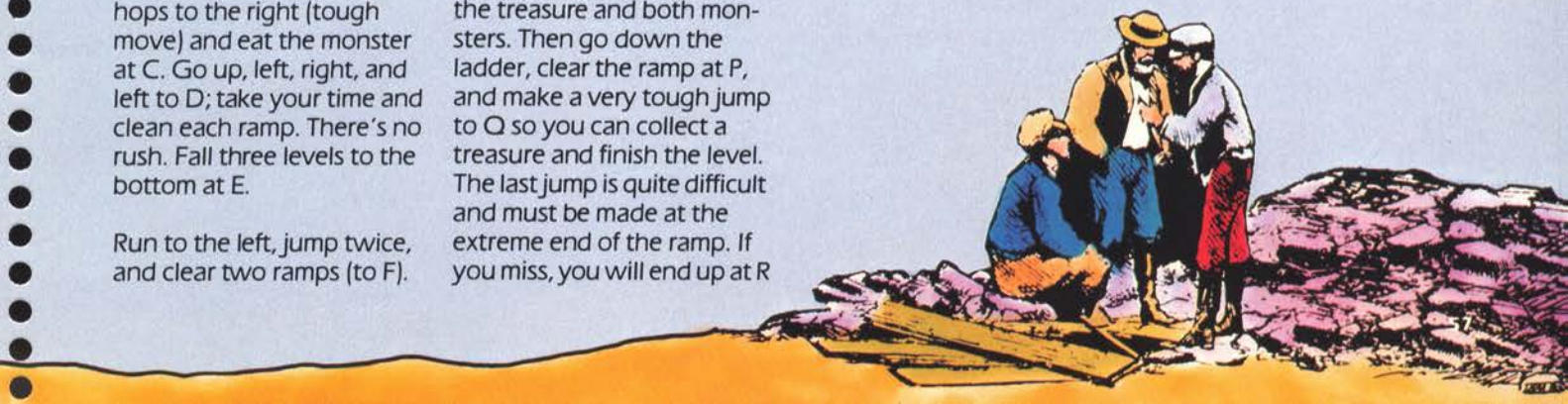
Next, go to M and jump straight up, making sure that you clear each ramp. Work your way to N and wait until the monster on the top level is just starting to make its way left. Jump, collect the treasure, and eat the monster at O. Swiftly climb the ladder to P and eat the monster there.

As you work your way across the treacherous top, remember that a slide starts at the exact middle of the displayed slide. Clear tiles from both sides, working your way across. The treasure in the middle can be used to eat the monster at Q.

When the top is clear, slide down to A and clear the ramp there. Then jump onto the moving ramp at R, and jump off at S. This is quite tricky and will require practice. Finally, climb the right side to complete this level.

Upper Levels

If you have mastered levels one through five, then six through ten will just challenge your reflexes a bit more.



CENTIPEDE

From: Atari, Inc.
For: Atari 400/800
Format: Cartridge
Requirements: 16K
Approx. Price: $44.95

Until 1980, two of Atari's most successful games were **Asteroids** and **Missile Command**, both of which contained fiery explosions and other forms of death and destruction. Hence everyone was a bit surprised by Atari's release of a cute game, **Centipede**. (The best similar Apple games are **Bug Attack** and **Millipede**.)

In this game, familiar household bugs are the opponents. A centipede appears at the top of a mushroom-littered screen and makes its way down toward you by moving back and forth, dropping one level each time it strikes a mushroom.

Spiders appear periodically and try to collide with you; they attack with deadly precision and are difficult to avoid. Scorpions also move along the mushrooms—"poisoning" them. When the centipede touches such a poisoned mushroom, the bug immediately dives to the bottom of the screen, endangering your player.

Centipede's sound effects and graphics are superb. The colors are bright and friendly, and the game has an undefinable cuteness—just like the arcade version.

CHOPLIFTER

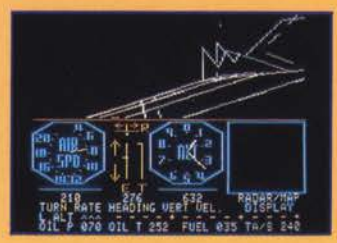
From: Broderbund Software, Inc.
For: Apple IIe/Plus, Atari 400/800, Commodore 64.
Format: Disk, cartridge.
Requirements: Disk drive; Apple, 48K (disk); Atari 400/800, 48K (disk), NA (cartridge); Commodore, NA (cartridge).
Approx. Price: Disk $34.95; cartridge, $44.95.

Hostages have been taken and are being held in houses deep within enemy territory. The houses have caught fire, and the hostages have run outside in the confusion! Can you rescue them?

You are in charge of a helicopter flying a difficult mission over the border to attempt a rescue. You must avoid enemy tanks, which are firing at both you and the hostages, and you must beware of enemy fighter planes, which swoop out of nowhere and launch missiles at you.

The graphics are tremendous, and the controls are very responsive to a delicate touch. Half the battle in winning **Choplifter** is learning how to control the helicopter's flight direction and missiles. Once this is mastered, the game becomes a highspeed challenge.

Choplifter may not make a real helicopter pilot out of you, but you will feel a sense of achievement when you land, discharge the hostages in the free country, and they stop to wave thanks at you.



FLIGHT SIMULATOR

From: subLogic
For: Apple IIe/Plus
Format: Disk, tape.
Requirements: Disk/tape drive; 16K (tape); 32K (disk).
Approx. Price: Disk, $33.50; tape, $25.00.

Flight Simulator is one of the most visually exciting games ever developed—right up there with **Star Raiders**. The game is a 3-D simulation of an aircraft in flight. Your through-the-window view of the outside terrain includes mountains, airfields, and other scenes.

This game is a great deal of fun, especially if you have flown an aircraft. You are given all the indicators necessary to make a successful flight. You must remember, above all, not to overcontrol, because the plane is quite sensitive. It is easy to stall into a spin, and then you are in real trouble.

The controls are pretty straightforward. On your computer, the T and V control your elevators, and F and H control the stick. Those keys are conveniently grouped together on the keyboard. The Apple arrow keys control the throttle.

Once you learn to maintain level flight (which is no small accomplishment) and land easily, you can attempt dogfights with enemy aircraft.

INDOOR SOCCER

From: Texas Instruments
For: TI 99 4/A
Format: Cartridge
Requirements: Standard memory.
Approx. Price: $29.95

If you are ready for the unpredictable challenge of playing against a human for a change, **Indoor Soccer** is a sports game that you'll enjoy. Designed for two players, **Indoor Soccer** places you and your opponent in control of teams on a conventional soccer field. You'll control your five-man teams using the joysticks.

Player control varies depending on position of the ball and on whether you're playing offense or defense. In a defense mode, you can move your entire field vertically and horizontally. While carrying the ball in an offense mode, you have control of the player that has the ball. For the kick, you control both timing and direction with the fire button.

In addition to constantly tracking your opponent's moves and protecting the goal, you must watch the game clock. At the start of the game, **Indoor Soccer** lets you set the length of time in minutes, and throughout the play, the clock ticks away. TI has managed to duplicate all of the effects of soccer on your screen, but any game like this can only be as challenging as your opponent. Against a skilled opponent, you'll find TI's **Indoor Soccer** a real challenge.

NAUTILUS

From: Synapse Software
For: Atari 400/800
Format: Disk
Requirements: Disk drive; 32K.
Approx. Price: $34.95

This game represents a new concept in computer gaming from Synapse. It is a two-player game, with one half of the screen devoted to each player. One operates a destroyer, laying depth charges; the other runs a submarine, trying to ravage an underground city that is defended by the destroyer. Each player is given a side view of the battle, and both sides scroll smoothly in all directions.

The view below the water's surface is a graphic paradise. You see the submarine, underground cities, swimming fish, heat-seeking torpedoes, and the constantly falling depth charges aimed at the sub.

The view on top resembles a typical, sunny ocean day. The destroyer makes regular trips back and forth, dispatching maintenance crews for the underwater city. Flying above, there are helicopters attempting to bomb the ship.

Nautilus is quite competitive and a lot of fun for two people to play. It also has a mode to set the computer against one player's ship or sub. The graphics and sound are well done and typical of Synapse games.

PICNIC PARANOIA

From: Synapse Software
For: Atari 400/800
Format: Disk, tape.
Requirements: Disk/tape drive; 16K.
Approx. Price: $34.95

Imagine your last picnic and you will immediately relate to the title of this gem from Synapse Software. The game deals with an average picnic—the kind we have all experienced. Remember the ants that got into the jelly? Or the wasp that stung your sister Caroline? What about the spiders that bit you on the foot? Picnics really are a good time. **Picnic Paranoia** is a bird's-eye view of a situation that might be called "The March of the Ants."

You are the frantic picnicker, armed with a flyswatter and bravely trying to keep the approaching insects away from several picnic tables loaded with food. Ants come first, attacking from all directions; you must run around the tables swatting them. If enough ants build up around a piece of food, they use a team effort to push it off-screen and you lose it. Then spiders and wasps appear to harass you; they can sting and temporarily prevent you from stopping the theft of your picnic.

The game is particularly funny because it is a ghastly vision of picnics as they might turn out. Anyone who has planned a picnic has thought of these terrible onslaughts from the insect world.

SEA DRAGON

From: Adventure International
For: Apple IIe/Plus, Atari 400/800, IBM PC, Radio Shack TRS-80 Color Computer.
Format: Disk, tape.
Requirements: Disk/tape drive; Apple, 48K (disk), DOS 3.3; Atari, 32K (disk), 16K (tape); IBM, 64K (disk); Radio Shack, 32K (tape).
Approx. Price: $34.95 (Apple, Atari, Radio Shack); IBM, NA.

Sea Dragon is like a horizontal version of **Caverns of Mars**. You must maneuver a submarine through an extremely narrow and twisting underwater passage, avoiding various obstacles along the way. Among the challenges you must face are to keep away from enemy gunners, to come up every so often for air (so that you don't run out), and to destroy enemy mines in your path and avoid any that remain. The mines tend to move in your direction if you get too close, just to make things more difficult.

This underwater battle is a challenge. There are some games in which you can afford to make a few mistakes; **Sea Dragon** is not one of them. You must execute the entire sequence of events perfectly, or you lose. It can be very frustrating, but you also experience an intense satisfaction when you finally get through.

WRACK 'EM UP

From: Roklan Software
For: Apple IIe/Plus, Atari 400/800, IBM PC.
Format: Disk
Requirements: Disk drive; Apple, 48K; Atari, 48K; IBM 64K, graphics option.
Approx. Price: $34.95

In high school physics, the action of one pool ball striking another is often used as an example to illustrate vector force mechanics. The equations that calculate the behavior of pool balls are extremely complex. Who would have thought that someone would computerize these equations and produce an amazing visual simulation of pool? Roklan did.

The pool table is viewed from the top. You can choose the angle and speed with which you want to strike the cue ball. You can specify table friction or no friction (the latter causes an endlessly bouncing cue ball). Aiming is very exact, with a "gross" and "fine" adjustment to help you shoot cautiously.

Wrack 'em Up is amazingly realistic. The pool balls can bounce in every direction—off each other, against the banks, and into pockets—all at once. It is a visual effect you have to see to believe. The precision with which the designers produced this pool simulation is incredible. It looks and plays like the real thing.

Try this game, if only to see this great reproduction.

HARDWARE: A REVIEW OF NEW SYSTEMS

SPECTRAVIDEO COMPUTERS

Spectravideo's SV-318 ("The Challenger") is among the most interesting of the many new microcomputers on the market. Spectravideo offers a single low-cost console (about $300) that can expand at additional cost in a variety of directions, to adapt to the different needs of different users.

The SV-318 offers the basic requirements for a game machine and home computer, with good color and sound capabilities. It comes with 32K RAM (16K of which is user-accessible) and can run all CP/M software, which means that it will handle many games already on the market. At the same time Spectravideo began distributing the SV-318, the company also began marketing compatible software—57 programs (most in the $20 to $50 range), including 20 games and 15 educational programs. A special adapter is also available to play all of Coleco's cartridges. The SV-318 keyboard is push-button style and includes five user-programmable function keys, three special work processing keys, and a joystick.

Spectravideo offers a competitive line of peripherals for its machine, including various internal expansions, such as extra memory, and all of the following: floppy disk drive, cassette drive, dot matrix printer, touch graphics tablet, 80-column video board, modem, and joystick controller. The SV-318 can be expanded to 256K RAM.

Spectravideo has announced that it will soon be offering a second personal computer—the SV-328. Its keyboard features typewriter-style keys and a numeric keypad (in place of the joystick). The SV-328 is designed for sophisticated home and small business applications, with built-in 80K RAM, Super Extended BASIC, CP/M compatibility, and word processing and super terminal programs. It will cost under $600 and be compatible with all Spectravideo peripherals.

NEC, a manufacturer of large computers, has entered the small computer marketplace with the PC-6001A. The PC-6001A, priced at about $350, comes with many standard items, including 16K RAM (expandable to 32K), sound synthesizer, high-resolution color graphics (256x192 pixels), built-in Microsoft BASIC, and five user-programmable function keys.

NEC manufactures a series of peripherals for the PC-6001A, all reasonably but not inexpensively priced: mini-disk drive (about $550, but you have to buy a special expansion unit, too—for about $100), joysticks (about $25 each), and a 40-character thermal printer (about $250).

Most of the NEC-manufactured software is in cartridge form (mostly games for about $35), but the PC-6001A has a standard Z80A processing unit which means that programs from independent manufacturers should become readily available on cassette or disk.

In addition to the PC-6001A, NEC makes the PC-8801A—a personal computer primarily for business applications. The PC-8801A comes with 64K RAM (expandable to 160K) and four software packages (**Multiplan, Wordstar, MailMerge,** and **CP/M 2.2**). It costs about $1200 (plus another $1100 for a set of dual disk drives and another $1000 for a color monitor)—more than you'd want to pay for games only!

MATTEL COMPUTERS

Mattel needs no introduction as a game manufacturing company, and now it has introduced the Aquarius home/game computer. Like the other newly introduced machines, the Aquarius has a low-cost console and a number of peripherals which can be used to tailor the system to the consumer's needs. The Aquarius is equipped with 4K RAM and sells for under $200. The Aquarius can produce 320 x 192 graphics in 16 colors. It offers Microsoft BASIC as the "built-in" programming language, and LOGO, the popular introductory programming language for children, is available in cartridge format.

The Aquarius has a maximum of 52K memory which can be reached with the addition of a special mini-expander unit and memory cartridges (4K and 16K sizes). A variety of peripherals are available including the following: cassette drive, disk drives, joysticks, printer, and modem.

Most of the software for the Aquarius will be on cartridges, and most of it will be games. Although a few household management cartridges have been announced, the Aquarius still seems to be primarily a game machine.

Adam is more than just another home computer for you to play games on. Just introduced by Coleco, Adam breaks a definite price barrier for high-grade home computers—those with large built-in memories and extensive potential business applications as well as excellent game-playing capabilities.

Priced at about $600, Adam is a system: typewriter-style keyboard, memory console with 80K RAM and 500K memory storage drive, 80-column bidirectional letter-quality printer, two joystick game controllers with built-in numeric keypad and omni-directional cursor control, a built-in word processing program, and two digital data packs (more on that later)—Smart BASIC and **Buck Rogers Planet of Zoom**. If that seems like a lot for about $600, that's because it is! And Adam is also available as an expansion module for the Colecovision system for about $400.

The memory console contains the 80K built-in RAM (which can be expanded to 144K), a slot for insertion of any and all Colecovision games cartridges, a port where you can add a second drive (a disk drive to be marketed soon), and a digital DataPack drive. Datapacks are a Coleco creation which operate on a special system called FasTransfer. It's best to think of them as super cassette tapes. This new data storage system provides faster access time than standard cassette tapes, and it's more economical than floppy disks. Coleco has plans to make the most popular CP/M software available in this Datapack format.

For game playing, in addition to accepting all Colecovision cartridges, Adam will have two optional expansion modules: one enables Adam to accept all Atari 2600 and many ActiVision, Imagic, and Parker Brothers games cartridges; the other allows Adam to perform as an arcade-style racecar—complete with steering wheel and accelerator pedal. At the same time, Coleco is introducing two new game controllers: the roller controller, featuring a 360-degree control ball; and the "super action controller," featuring a super-responsive, directional joystick, special roller, four multiple-use player-select buttons, and a 12-button keypad.

For other applications, the Adam has great potential, having been designed with an integrated word processing system. The SmartWriter program is built-in, and the keyboard works with it, featuring six word processing command keys and six user-programmable keys (plus five cursor control keys). But perhaps the most notable feature of the system is that it includes the SmartWriter letter-quality daisywheel printer. The printer delivers 10 characters per second (120 words per minute), prints on any kind of paper (including fanfold computer paper, although a tractor-feed unit, available soon, will cost a little more), takes standard film ribbon cartridges (which are easy to change and come in many colors), and uses standard daisy wheels (the printing element which strikes the paper). Included with the printer is a popular Diablo Pica 10 daisy wheel. The most comparable printer currently on the market is the Smith-Corona TP-1, which, by itself, costs between $450 and $800.

One potential drawback to Adam lies in its software. Coleco has not yet announced whether or to what extent it will cooperate with third party software manufacturers; if the company tries to keep an extremely tight hold of software availability, that may be a problem.

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Atari Program Exchange (APX)
P.O. Box 3705
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Avalon Hill Game Co.
4517 Harford Road
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Big Five Software
P.O. Box 9078-185
Van Nuys, CA 91409
(213) 782-6861

Broderbund Software
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California Pacific
757A Russell Boulevard
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Commodore Business Machines Inc.
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West Chester, PA 19380
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Computer Advanced Ideas
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Suite 341
Berkeley, CA 94709
(415) 526-9100

The Cornsoft Group
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Indianapolis, IN 46220
(317) 257-3227

Datamost Inc.
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Datasoft, Inc.
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Dynacomp, Inc.
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Edu-Ware Services, Inc.
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Epyx/Automated Simulations
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Sunnyvale, CA 94086
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IDSI
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(505) 522-7373

Infocom, Inc.
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Cambridge, MA 02138
(617) 492-1031

The Learning Company
545 Middlefield Dr.
Suite 170
Menlo Park, CA 94025
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Muse Software
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Quality Software
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Reseda, CA 91335
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Radio Shack
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One Tandy Center
Fort Worth, TX 76102
(817) 390-3011

Roklan Corp.
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Arlington Heights, IL 60004
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Sentient Software Inc.
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Aspen, CO 81612
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Sierra On-Line, Inc.
Sierra On-Line Bldg.
Coarsegold, CA 93614
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Sirius Software
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Sir-Tech Software
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Strategic Simulations Inc.
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subLogic
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Synergistic Software
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